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THE BEQUEST OF

WALTER FAXON

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———" What is a man,
If his chief good and market of his time
Be but to sleep and feed? A beast, no more.
Sure, He, that made us with such large discourse
Looking before and after, gave us not
That capability and godlike reason,
To fust in us unused."

HAMLET, ACT IV. SCENE IV.

THE

NATURAL HISTORY OF THE INSECTS

MENTIONED IN SHAKSPEARE'S PLAYS.

W. L. Graves & Co. Printers, London.

Gaussen Portrait engr. for 1825 ed. of Th.
[illegible] Abhandlungen printed 1811

Wm. SHAKESPEARE.

THE

NATURAL HISTORY OF THE INSECTS

MENTIONED IN SHAKSPEARE'S PLAYS.

WITH UPWARDS OF EIGHTY ILLUSTRATIONS.

BY ROBERT PATTERSON,

TREASURER OF THE NATURAL HISTORY SOCIETY OF [illegible].

LONDON:

A. K. NEWMAN & CO. LEADENHALL STREET.

1841.

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WALTER FAXON
MARCH 16, 1921

PREFACE.

It was my duty, in common with other members of the Natural History Society of Belfast, to furnish papers for some of those meetings in our Museum, held on what are termed "Public Nights." On these occasions ladies as well as gentlemen are admitted as visitors, and the reader abandons, in a great degree, the technicalities of science for "metal more attractive."

Several of these papers I had the honour of reading at various intervals between the 1st of March, 1832, and the 1st of January, 1836. They were then thrown into the epistolary form, in which they appear in the following pages; and with the exception of some verbal amendments, and the introduction of some additional quotations, as the sheets were passing through the press, they are now printed as they were then arranged.

This brief statement of the circumstances under which these "Letters" were written will, I trust,

extenuate many of their imperfections. They were designed as the commencement of a series of illustrations of the Natural History of Shakspeare's Plays. The attempt to blend the imagery of the Bard with the facts recorded by Science, has been made in the humble hope, that the worshippers of our Great Dramatist might be pleased to see another offering laid upon his shrine, and that the youthful lovers of Entomology might be attracted by the exhibitions of her charms, reflected in the bright imaginings of the Poet.

All arrangements with respect to the illustrative woodcuts have been entrusted to the Publishers. Many of these they were enabled to give without adding to the expense of the work, and for others they are indebted to the pencil of Mr. G. F. Sargeant, a young artist of taste and talent. To J. O. Westwood, Esq., the indefatigable Secretary of the London Entomological Society, my grateful acknowledgments are due for the flattering terms in which, both to myself and others, he expressed himself respecting the MS. of this little work, and encouraged me to venture on its publication.

R. P.

Belfast, 3, College Square North,
13th June, 1838.

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" The bounteous huswife, nature, on each bush
Lays her full mess before you."

TIMON OF ATHENS, ACT IV. SC. III.

Your letter, my dear Arnold, has been received. It is but two months since you wrote to me of your arrival at your new habitation—the kindness of your reception, the delightful situation of the village, and the hospitality of your future parishioners; but a change seems to have passed over your spirit, to have "overcome" you "like a summer cloud," and has excited, I must confess, my "special wonder." You do not write in that tone which bespeaks a healthy ac-

tivity of mind and body. A little querulousness (you must excuse the expression) is now and then apparent; and you resemble the mariner who sighs to exchange the apathy of the calm, for the excitement of the gale, or even the perils of the storm. This seemed to me "passing strange;" but one phrase in your letter has enabled me to solve the enigma. While pursuing your studies in the house, you appear happy—while there you find your library "a dukedom large enough" —while executing those missions of "peace and good will to man" which the exercise of your profession requires, you are all I could wish my friend to be; but when you tell me that there are moments in your rambles in which you are tempted to envy the activity of the husbandman, or the ardour of the sportsman, I strongly suspect the mind is in some degree "diseased;" something is wanting, and that something seems to be simply this: The husbandman takes a deep interest in the fluctuations of the weather, and the revolutions of the seasons. "The seed-time and harvest" are indicated by a thousand circumstances, which he is prompt to notice; these modify his labour and influence its result. The sportsman, in like manner, finds his interest aroused by a thousand varying phenomena: the mildness, or the severity of the winter; a late or an early spring; a dry or rainy summer, all produce certain results upon the objects of his pursuit,

and require a corresponding variation in his procedure. The piercing note of the wild swan, high in the frosty heavens, and the "booming" of the bittern from the "sedgy shallow," arouse his attention and awaken his destructive energies to action. Husbandman and sportsman are alike in one respect,—they both take a deep and active interest in some of the phenomena of nature; but by these phenomena you are comparatively unmoved. THEY DO NOT FURNISH YOU WITH EMPLOYMENT. You pay a passing tribute to the chaste beauty of the snowdrop, or to the matin song of the sky-lark, and pursue your path without that degree of interest being excited, which suggests something to be *done*, some difficulty to be surmounted, or some information to be acquired. You observe them, but they do not influence your pursuits — you see them, but you seek not to investigate the mechanism of the one, or the habits of the other.

I do believe, that if the true cause of your dissatisfaction were explored, it would be found to spring from what I consider a radical error in the system of education pursued in our universities. You have passed through the usual course with honour—you have on many occasions won "golden opinions from all sorts of people," and yet I do venture to assert that the defects in this very course of education, are the primary causes of your present discon-

tent. Take one of those graduates who have been most distinguished; ask him concerning an event in the ancient history of the world, the translation of an admired passage in Anacreon, or the connection of classic fable and historic truth, and in all probability your questions will be answered. Inquire how the knowledge of mathematics gives new views of the sublime science of astronomy, and you will receive the information you demand. Request an exposition of some particular theory in metaphysics, and your desire may still be gratified. But ask the same student to describe the functions or uses of some common plant, or insect,—one which he sees every day, with which he has been familiar from childhood, and he will be unable to answer, nay, most likely, unable to tell its name.

This is the radical error in university education. Its votaries are conversant with books, not with nature; or, as it has been quaintly expressed, "they view nature through the spectacles of books." With the works which form the most lasting monuments of the talents of man, they are familiar; of those nobler works which bear the visible impress of the Deity, they are profoundly ignorant.

I have no desire that you should become either a farmer or a sportsman; but with your mental powers and habits of observation, I should rejoice, indeed,

to see you become a naturalist; not one of that kind who suppose a knowledge of nature to consist in a knowledge of the terms which have been applied to her works, or of the sections into which they have been divided; but one who studies the *things themselves*, and gives to classification its proper functions, namely, that of designating correctly the individual objects of his inquiry. Such a man will not look with wonder on any thing that is strange, merely because to him it is new or uncommon, neither will he regard with indifference things which are equally wonderful, because he sees them daily around him. This is not the fitting disposition of a naturalist, nor is its indulgence calculated to bring home the love of nature to the thoughts and affections of men, or furnish that series of pleasurable emotions, which the proper knowledge of the objects by which we are surrounded would so incessantly afford. In its true and legitimate exercise, the knowledge of natural history unveils to its votary "gems hidden from the world beside," and even her wildest and most uncultivated scenes—

> "The desert, forest, cavern, breaker's foam,
> Are unto him companionship."

To any man, but more especially to one of your profession, the mental effects of such pursuits are of the very highest importance, and I am glad, on this point, to fortify my own opinion by the words of

Archdeacon Paley :—" In a moral view I shall not, I believe, be contradicted when I say, that if one train of thinking be more desirable than another, it is that which regards the phenomena of nature with a constant reference to a supreme, intelligent author." Nor can the study be considered as unworthy of our notice, when we are told of Solomon, that he "spake of trees, from the cedar tree that is in Lebanon, even unto the hyssop that springeth out of the wall; he spake also of beasts, and of fowl, and of creeping things, and of fishes."

Prior, however, to the study of these details, our attention must be directed, and to a certain extent it is irresistibly impelled, to the contemplation of the periodical changes which the aspect of the external world is ever undergoing.

> ———" the seasons come,
> And pass like shadows to their viewless home,
> And come again, and vanish."

Each of them exhibits distinct and characteristic features, and brings attractions and motives for exertion peculiarly its own. And these changes are not confined to inanimate nature; for to a reflective mind, which scans with attention these evanescent trains of thought and feeling, it is interesting to remark how very different the same man is at different seasons. For instance, your ideas of pleasure in December and

June are no doubt as completely distinct, nay, as much contrasted, as would be those of different individuals living in distant regions. Should any one doubt this, let him compare his emotions during a morning walk in spring with those in a summer noon, when he stretches "his listless length" under some "nodding beech," or with those he experiences when he draws his chair closer to the fire on Christmas eve. To this fertile field for observation, I solicit your attention: it has one advantage over most other subjects of inquiry, that you have ever the materials for its prosecution within you and around you.

The pursuit I more especially recommend, namely, the study of Natural History, in its widest signification, would, I am persuaded, be to you, my dear Arnold, a source of gratification, "ever charming," yet "ever new." But I will candidly own I am not altogether disinterested, and that I am anxious to procure your co-operation and assistance in a project which I yet hope to accomplish. I am anxious to ascertain if poetry and natural history might not "each give to each a double charm"—if poetry might not lend "thoughts that breathe, and words that burn," to declare the wonders that natural history unfolds. Reality, in this case, is more wonderful than fiction; yet the reality is not brought home to the minds and hearts of men, as it would be if arrayed in the glowing garb of

poetry: a fact, when "married to immortal verse," would be "one entire and perfect chrysolite," and remain for ever in the mind, "unmixed with baser matter. "And what would poetry not gain, if access were afforded to this new and almost unopened mine? The riches of the garden of Aladdin would fade before the splendour of her new dominions. Besides, you must recollect, that poetry is so pleasing a vehicle for the expression of thought; so fascinating a medium for the inculcation of a particular feeling or idea, that it becomes a most powerful agent either in disseminating truth, or in perpetuating falsehood. How very desirable would it be if every poet were at the same time a naturalist. Many depict, and depict most truly, some of the attractive objects which Nature, as if to win us to herself, has placed on our right hand and on our left; but seldom have they done so without an intermixture of error, and too often do we find that fancy takes the place of observation. It would become, therefore, a curious and pleasing subject of inquiry to ascertain to what extent one of our most admired poets had faithfully arrayed in the rich garniture of his verse, the phenomena which he himself had seen, or how far he had preserved there the errors of preceding writers.

This inquiry prompted me to read again the plays of Shakspeare. I read them, however, not to

analyze one of the characters, to criticise the structure, or unfold the beauties of a drama, but to ascertain what notices of natural objects they contained. I may, perhaps, have been influenced in my selection of Shakspeare's Works by the opinion which Dr. Johnson has expressed in his celebrated preface. After applying to Shakspeare the epithet of "the Poet of Nature," he remarks, "His attention was not confined to the actions of men; he was an exact surveyor of the inanimate world; his descriptions have always some peculiarity, gathered by contemplating things as they really exist; whether life or nature be his subject, Shakspeare shows plainly that he has seen with his own eyes. He gives the image which he receives, not weakened or distorted by the intervention of any other mind; the ignorant feel his representations to be just, and the learned see that they are complete." But I was still more guided in my choice by the testimony of my friend the late John Templeton, Esq., that "the works of Shakspeare evince a surprising power of accurate observation," and he added, although I may not quote his words correctly, "that while Milton and the other poets had strung together in their descriptions the blossoms of spring and the flowers of summer, Shakspeare has placed in one group those ONLY which may be found in bloom at the same time.

His defects are those of the age in which he lived; the beauty and truth of his pictures are his own."

To show the justness of this remark, only look at the enumeration of flowers in Milton's Lycidas, and that of Shakspeare in the Winter's Tale. In the former we have, among "vernal flowers," many of those which are the offspring of Midsummer. The musk-rose, the woodbine, and the amaranthus of a still more advanced season, are grouped with the daffodil, the primrose, and the violet of early spring.

'Bring the rathe primrose that forsaken dies,
The tufted crow-toe, and pale jessamine,
The white pink, and the pansy freak'd with jet,
The glowing violet,
The musk-rose, and the well attired woodbine,
With cowslips wan, that hang the pensive head,
And every flower that sad embroidery wears;
Bid amaranthus all his beauty shed,
And daffodillies fill their cups with tears,
To strew the laureat hearse where Lycid lies."

In the Winter's Tale, Perdita presents the "flowers of winter, rosemary and rue," to her reverend guests; "to men of middle age," are given the "flowers of middle summer."

"Hot lavender, mints, savory, marjoram,
The marigold, that goes to bed with the sun,
And with him rises weeping."—*Act IV. Sc.* 3.

When she addresses her "fairest friend," her words are

"I would I had some flowers o' the spring, that might
Become your time of day!"

and "yours and yours," she continues, as she addresses those of a more advanced age; and in her invocation

> "O Proserpina
> For the flowers now, that, frighted, thou let'st fall
> From Dis's waggon"—

she retains the same order, beginning with the daffodil, and ending with the fleur-de-lis:

> "daffodils,
> That come before the swallow dares, and take
> The winds of March with beauty—violets, dim,
> But sweeter than the lids of Juno's eyes,
> Or Cytherea's breath; pale primroses,
> That die unmarried ere they can behold
> Bright Phœbus in his strength, a malady
> Most incident to maids; bold oxslips, and
> The crown imperial; lilies of all kinds,
> The fleur-de-lis being one!"

I was thus led to examine the plays of Shakspeare with respect to the notices of natural objects which they contain, and I soon found that these notices were much more numerous than I had expected. I transcribed the passages containing them, under the several heads which naturalists have adopted in their classifications, and found, to my surprise, that they occupied one hundred closely written pages of letter paper. Of these, twenty-two pages related to the mammalia; sixteen to birds; nine to reptiles and fishes; two to shells and minerals; nine to insects; thirteen to trees, flowers, and fruits; and twenty-

nine to those ever-varying features, which mark the progress of the seasons, or depict some of the countless phenomena of nature. What ample materials for investigation those extracts would afford! and their elucidation would be highly interesting, for it would place in juxta-position the state of natural science now, and at the vaunted era of Queen Elizabeth.

In my next letter, I shall mention to which of its several branches I wish first to call your attention, and lay before you some of the advantages arising from the pursuit.

"In Nature's infinite book of secrecy
A little I can read."

ANTONY AND CLEOPATRA, ACT I. SC. II.

I MUST apologize, my dear friend, for having allowed some days to elapse without resuming the subject introduced in my last letter; but the avocations of business will occasionally interpose, in the performance of many of the offices of friendship. Occupied as I at present am, it is but seldom that I can snatch a few consecutive hours, to pay my homage to literature or to science. Trifling as my acquisitions in either may be, they are still sufficient

to keep alive the taste for both; and, consequently, if future years should bring with them a larger portion of leisure, I hope and trust they will be unaccompanied with that *tædium vitæ*, which too often destroys the anticipated happiness of the man of business. The object of my attention, in those hours which are stolen from the bustle of the world, has of late been natural history; and I can safely affirm that it has afforded a tranquillising, contented, and invigorating spirit, when both mind and body have been fatigued with the unremitting exertions which business occasionally demands. To you, who want occupation, the study would produce a different, but equally beneficial result. It would stimulate to activity faculties which now lie dormant, and rouse to pleasurable exertion, powers which languish for want of a proper stimulus. The particular branch of natural history to which I have lately given my attention, has been that which treats of the various tribes of insects; or, to use a more concise and more scientific expression, Entomology. My progress has not been so considerable as to give me that knowledge of specific distinctions, which one who lays claim to the title of an entomologist should possess; but it has been sufficient to teach me the principal divisions of the science, and to make me acquainted with the most obvious peculiarities in

habit, by which many insect tribes are distinguished. I have, I must own, been more anxious to learn something of their habits, than of their classification; and although I have commenced forming a small collection to illustrate the latter, I value it only as serving to elucidate the former. You will see from this statement, that I am a lover of entomology, rather than an entomologist. Humble as this appellation may be, it is one which I must for, perhaps, a considerable time, be contented to retain. Its lowliness has not, however, prevented me from enjoying many pleasing trains of thought, excited by the pursuit—many happy feelings of novelty and wonder; and at all seasons the study has furnished me with something for observation. I am most anxious, therefore, my dear Arnold, that the pleasure I have felt, you should experience; and although I may be a guide very imperfectly acquainted with the paths I propose to traverse, I shall be delighted to point out to you the most important landmarks, and indicate the existence of wild glens and retiring valleys which you may yourself explore.

We are all too apt to associate ideas of importance with the possession of corporeal bulk, and to regard as trifling all those animals which are diminutive in size. This may be one reason why the study of entomology is comparatively of modern date; for, so

strong and so general is this prejudice, that he who devoted his days to observing the habits and economy of insects, would have been regarded as a weak and frivolous mortal—as a busy and unprofitable idler, and unworthy to rank with men who were engaged in more bustling occupations. A wiser and more philosophical spirit has now arisen, and anything, however minute, which God has been pleased to create, is no longer deemed unworthy of man to study. "The beauties of the wilderness are His," and the leafy monarch of the forest, the lowly and fragile flower, the leviathan with his plated mail, and each tiny wing that flutters in the sunbeam, are but so many varied manifestations of the same Almighty Power. To you, therefore, the study of insects will have many attractions, for few are better calculated than yourself

> "To trace in nature's most minute design
> The signature and stamp of power divine;
> The shapely limb, and lubricated joint,
> Within the small dimensions of a point;"

and to feel the justice of Burke's observation, that we cannot, in the effect on the mind, distinguish the extreme of littleness from the vast itself. As, however, the state of mind which the feeling of surprise creates, or the sense of the sublime occasions, is in its very nature transitory, though delightful, I would

not, on the present occasion, lay much stress upon this recommendation. I would rather allow the study to win you to itself, by the permanence of the agreeable ideas it is calculated to excite. One source of these ideas is the form and the colouring of insects: and any one who attempts to describe such characteristics, may exclaim, as Thomson has done of the flowers of spring,

"Oh! what can language do!"

Kirby and Spence, with that enthusiasm which their knowledge of the subject both creates and justifies, remark, "To these, her valued miniatures, Nature has given the most delicate touch and highest finish of her pencil. Numbers she has armed with glittering mail, which reflects a lustre like that of burnished metals; in others she lights up the dazzling radiance of polished gems. Some she has decked with what looks like liquid drops or plates of gold or silver, or with scales or pile, which mimic the colour and emit the ray of the same precious metals."

"Their colours also are not evanescent and fugitive, but fixed and durable, surviving their subject, and adorning it as much after death as they did when it was alive." In this respect the Entomologist possesses an advantage over most of his brother natu-

ralists. The loveliest rose that ever unfolded her petals to the skies of June, the sweetest violet that ever yielded her fragrance to the wooing breath of April, are alike reft of their beauty, when transferred to the *hortus siccus* of the botanist. The ornithologist may obtain for his herons, his swans, and his falcons, their respective attitudes, but he must do so at considerable cost, and requires a range of apartments for their display and classification. The specimens of the mineralogist are frequently of considerable bulk and weight, and require a corresponding space for their arrangement. The Entomologist, on the contrary, can, in a single drawer of moderate dimensions, preserve hundreds of insects, with all the colouring and attitudes of life. Yet it is not because of their colours, though rich; or their forms, though varied; or both, though beautiful, that I recommend them to your notice. As beings endued with life, they have higher claims on your attention. Morning, noon, evening, and night, has each its own race of happy insects; they flit in the warm sunbeam of summer, and desert not the icy mantle of winter.

Another reason why some attention should be given to the study of insects, is the greatness of their numbers, compared with that of the other tribes of animated beings. The mammalia, birds, fishes, and reptiles, at present known, and the mollusca,

zoophytes, and microscopic animalcules, described by naturalists, amount altogether to about twenty-five thousand species. The Count Dejean has catalogued more than twenty thousand coleopterous insects alone. Stephens describes ten thousand British species; and those now arranged and named in the Royal Cabinet, at Paris, amount of themselves to above twenty-seven thousand,* a number greater than all the other varieties of animal life, taken together, with which we are at present acquainted. If to this were added those which the collection at Paris does not possess, but which other cabinets contain, those named in manuscripts scattered through different countries in Europe, and the new genera which are daily made known to us, both in the east and in the west; the number of species already known could not be less than fifty thousand! But this number, great as it may appear, is trifling compared with the myriads with which we are as yet unacquainted, but whose existence is rendered more than probable by the tribes which the accurate investigation of any district, however limited, is continually unfolding to our view. Kirby and Spence, in their admirable "Introduction to Entomology,"

* This estimate of the number of known species was made some years ago, when the letters were first written: the numbers have been greatly increased during the last few years.

agree with Mr. M'Leay in calculating the existing number of species at four hundred thousand! *

Even here the treasures of the Entomologist are not exhausted. The geologist finds in shale the impressions of insects, stamped on the yielding surface of the mineral, and there presenting their correct and enduring portraiture. In amber he discovers insects in the very attitudes of life, and of species which have long since become extinct. These representatives of a former insect world are to the Entomologist what the skeletons and ornaments of Pompeii would be to the antiquarian, or fossil fishes to the ichthyologist. They are the records of another era, unfolded for our study.

We must recollect also, that an accurate knowledge of the habits and economy of insects is of considerable importance to the comfort, and to the security of man. Though each may individually be regarded as insignificant, their numbers compensate for their diminutive size, and thus banded together, they become absolutely irresistible. Wilson, in his "American Ornithology," says, "Would it be believed that the larvæ of an insect or fly, no larger than a grain of rice, should silently and in one season destroy some thousand acres of pine trees, many of them from two to three feet in diameter, and a hundred and fifty

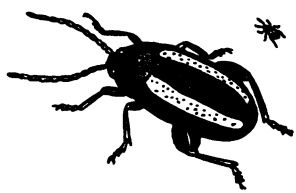
* Introduction to Entomology, vol. iv. p. 476.

feet in height? In some places the whole woods, as far as you can see around you, are dead;—stripped of their bark, their wintry-looking arms and bare trunks bleaching in the sun, and tumbling in ruins before every blast." In tropical countries the white

Queen of the White Ant in the winged state, and filled with eggs.

ants are so voracious that, according to Smeathman, "the total destruction of deserted towns is so effectually completed, that in two or three years a thick wood fills the space." Humboldt states that, as they devour paper and parchment, many provinces of Spanish America cannot in consequence shew a written document of a hundred years' existence, and he justly inquires, "What developement can the civilization of a people assume, if there be nothing to connect the present with the past,—if the de-

positories of human knowledge must be constantly renewed,—if the monuments of human genius and wisdom cannot be transmitted to posterity." The very name of the locust calls up ideas of desolation and famine. "The land is as the garden of Eden before them, and behind them a desolate wilderness." From this awful pest we are in this country happily free, but we are exposed to the attacks of many others, which, at times, are scarcely less formidable. The turnip fly and the wire-worm have often ren-



Turnip Fly.

dered vain the hopes and the labours of the farmer. Crops of grain have been destroyed, fruit trees blighted, and plantations overthrown, by other tribes of these Lilliputian devastators. One of the *Aphides* appears occasionally in such multitudes, that Thomson has thus introduced it into his description of the phenomena of spring :—

"For oft, engender'd by the hazy North,
Myriads on myriads, insect armies warp

Keen in the poison'd breeze; and wasteful eat,
Through buds and bark, into the blacken'd core,
Their eager way. A feeble race! yet oft
The sacred sons of vengeance, on whose course
Corrosive Famine waits, and kills the year."

With the exception of their not being "engendered by the hazy North," but produced, like all other insects, from eggs previously deposited, the description of the poet is perfectly correct. A writer in the Entomological Magazine, (No. iii. p. 221,) concludes an account of the habits of another species of insect, the *Aphis humuli*, one which preys upon the hop plant, in the following words:—"From this it will appear that in duty alone, a little insignificant looking fly has a control over four hundred and fifty thousand pounds annual income to the British Treasury; and, supposing the hop grounds of England capable of paying this duty annually, which they certainly are, it is very manifest that, in 1825, these creatures were the means of robbing the Treasury of four hundred and twenty-six thousand pounds."

The advantages which insects produce are, however, more important than the injuries they occasion. To multitudes of our "little trooping birds" they supply food, and that to an extent that no one would at first suppose possible; for it has been calculated, that a single pair of sparrows having young to main-

tain, will destroy three thousand three hundred and sixty caterpillars in a week.

To fishes they are of equal importance, as I had myself on one occasion an opportunity of observing, at Lough Beg, a small lake through which the river Bann flows in its course to the sea. As we were crossing in a boat from the main land to Church Island, the spot where the celebrated Jeremy Taylor penned many of his most eloquent productions, a sudden gust of wind arose, accompanied by heavy rain, and precipitated into the water multitudes of the day-fly (*Ephemera vulgata*), which had been sporting over

Larva, Pupa, and Imago of Ephemera vulgata.

the lake. So great was their number, that as we rowed rapidly forward, we could not, for the space of fifteen minutes, during which we were every instant changing our position, discover two square

feet on the surface of the water, on which there was not at least one of these flies, and not unfrequently there were eight, ten, or twelve, in that extent of superficies. On a subsequent occasion, I noticed a mass of two-winged flies (*Tipulidæ, &c.*), some inches

Cecidomyia destructor, and tritici, with Larvæ, all feeding.

in thickness, cast upon the beach of Lough Weagh, not far from the town of Antrim.

To "man, proud man," they bring rich and numerous offerings. The gall of the oak, which,

Oak Apple, Gall, and Cynips quercus folii.

when converted into ink, "speeds the soft intercourse

from pole to pole," and allows the philosopher to transmit his discoveries to future ages, is only the production of an insect. Honey, which from the earliest times has been the emblem of all that is most grateful to the palate, is another tribute from the insect world. The bright dye of the cochineal is supplied by an insect; and silk, the use of which is still more widely diffused, is, perhaps, the most extraordinary existing example, of the benefits derived by man from the labours of the insect tribes.

I hope enough has now been adduced to show that the study of Entomology should not, by any reflective mind, be regarded as frivolous or degrading, and that if we would either derive advantage or escape injury from insects, a knowledge of their habits and economy is alike indispensable.

"Hast thou the pretty worm of Nilus there,
That kills and pains not?"

ANTONY AND CLEOPATRA, ACT V. SC. II.

I SHALL now, my dear Arnold, in this and in my subsequent letters, bring before you some of the particulars relative to the natural history of those insects mentioned in Shakspeare's plays. From the writings of eminent entomologists, or from extracts from works which are not generally accessible to the inhabitants of a provincial town, I have at various times received much of the information they may contain. In some instances I have copied in my note book the passage in which any remarkable fact was embodied. These

extracts are not numerous, and as they may perhaps prove interesting, I shall be glad to transmit them to you in the words of their respective authors. It has sometimes been in my power to verify those statements by my own observations, and occasionally, although very rarely, to add something to the knowledge they convey; but my great object will be to point out how the remarks of the Poet are borne out by the discoveries of modern science.

If these letters induce you to examine the facts for yourself, and to fill up those blanks which I shall occasionally indicate, I shall rejoice at having been the humble instrument of "a consummation" so "devoutly to be wished." Should the important avocation in which we are both engaged permit us to enter together on the natural history of the quadrupeds, the birds, or the plants which Shakspeare has dignified by his magic touch, it would be delightful to reciprocate with each other the information we might respectively obtain, and communicate our observations on a subject of common interest to both. But I must own that "the wish is father to that thought," for, situated as I am, it is scarcely possible for me to take a fair proportion of the exertion necessary for such an object. You, however, are so differently circumstanced, that you may hope to effect that, which I am able only to desire. Of

two things I am quite certain—that a knowledge of the Natural History of Shakspeare's Plays would increase the pleasure we all experience in reading those unrivalled productions; and that to the inquirer, the pursuit would be replete with interest. He would tread a path of softest verdure; he would behold a brighter sky; he would breathe a more balmy atmosphere, and might well say, like Caliban, while escorting the mariners under the unseen guidance of Ariel,

> ———"The isle is full of noises,
> Sounds, and sweet airs; that give delight, and hurt not."
> *Tempest*, Act III. Sc. II.

That the subject on which I am now about to enter may be proceeded with in regular order, it is better "to begin with the beginning:" I shall, therefore, in my present letter, confine myself to some observations on insects, in their imperfect or immature state.

We find that the Prince of Denmark, the reflective and philosophical Hamlet, employs on one occasion the words, "If the sun breeds maggots in a dead dog," (*Act I. Scene II.*); and he uses them in a manner that shows he did not question the truth of the position. Let it not surprise you, that a prince of mental powers sufficient to descant upon "this goodly frame the earth," and to utter the sublime apostrophe, "What a piece of work is man!" should adopt an opinion so erroneous. It was the universal

belief of the age in which Shakspeare lived; and it was not until near the conclusion of the sixteenth century, that it was proved by the experiments of Redi to be utterly groundless. This forms one example of the progress of human knowledge in destroying "that labyrinth of idle fancies and unsupported fables, which, entangled with one another like a Gordian knot, have even to this day obscured the beautiful simplicity of this part of Natural History."*

The vertebrate animals by which we are surrounded retain through life, with some variations in size and colouring, very nearly the same form they had at

Chrysalis and Caterpillar of the Magpie Moth.

their birth. Insects, on the contrary, have their parts and powers progressively developed, and pass

* Swammerdam, Book of Nature, p. 223.

in general through four distinct stages of existence. They are first contained in eggs deposited by the parent. They then become active and rapacious, and in this state some tribes are known by the common names of maggots, grubs, or caterpillars, all of which are included by naturalists in the term larvæ.

Every one is familiar with their appearance, and few unacquainted with their destructive powers. They have furnished Shakspeare on many occasions with appropriate metaphors. Thus the creatures of Richard are termed by Bolingbroke "the caterpillars of the Commonwealth," (*King Richard II.*, Act II. Sc. IV.), and the Duke of York's reflection on the destruction of his hopes, is,

> "Thus are my blossoms blasted in the bud,
> And caterpillars eat my leaves away."
>
> *Second Part Henry VI.*, Act III. Sc. I.

"False caterpillars" is the epithet bestowed by Jack Cade and his "ragged multitude" on their opponents; but never is the image employed in a manner more just, and yet more melancholy, than when in King Richard II. the gardener enters into a colloquy with his attendant on the state of the kingdom, while the queen, who had entered "to drive away the heavy thoughts of care," becomes a concealed listener to their discourse. Instead of

silently executing the directions of his superior to

"Cut off the heads of too fast growing sprays,"

the servant inquires—

"Why should we in the compass of a pale
Keep law, and form, and due proportion,
Shewing, as in a model, our firm state;
When our sea-walled garden, the whole land
Is full of weeds; her fairest flowers choked up,
Her fruit trees all unpruned, her hedges ruin'd,
Her knots disorder'd, and her wholesome herbs
Swarming with caterpillars?"—*Act III. Sc. IV.*

The next state of insects is the *Pupa*, or Chrysalis, in which they assume very different forms and diversified habits. Some are lively and active, as the crickets and cockroaches, which are found in our kitchens. Others are enveloped in a peculiar covering, called a cocoon, formed for the occasion, and composed of leaves, of wood, or of silk. Now all appearance of vitality is lost, until at its appointed time the enclosed insect bursts its sepulchre, flings off the vestments of the tomb, and, gifted with beauty of form, and with powers unknown before, enters on the enjoyment of a new state of existence. To you I need not say anything of the classical associations or the train of spiritual reflections which such a change is calculated to excite. Without indulging in either the one or the other, Shakspeare has employed his knowledge of the fact to illustrate

the altered condition of Coriolanus, when from a Roman general he has become the invincible leader of the Volscians in their progress against his native city. "Is't possible," asks Sicinius, "that so short a time can alter the condition of a man?" and most justly is he answered by Menenius: "There is a difference between a grub and a butterfly, yet your butterfly was a grub."—*Act V. Sc. IV.*

Caterpillar, leaf-cocoon, and chrysalis of the Prometheus Moth.

Almost every one has noticed the destruction of clothes, furs, and tapestry by the *larvæ* of minute moths (*Tineidæ*). It is not to be supposed, therefore, that the all-seeing eye of Shakspeare should pass un-

noticed so ordinary an occurrence. We accordingly find reference made to it in more than one instance. Thus Borachio, in "Much Ado about Nothing," speaks of "the smirch'd moth-eaten tapestry;" and when the visitor of Virgilia is wishing her to "lay aside her stitchery" and play the idle huswife," she tauntingly says, "You would be another Penelope; yet they say all the yarn she spun in Ulysses' absence did but fill Ithaca full of moths."—*Coriolanus*, Act I. Sc. III.

There is another insect of the same family whose choice of a dwelling evinces a more refined luxuriousness, if, indeed, we are warranted in making use, even metaphorically, of such a term, when to every insect the food destined for its support is that which is most grateful to its palate. The larva I allude to (*Lozotænia Rosana*) passes by the "smirch'd tapestry," and chooses for its domicile "the fresh lap of the crimson rose." It there lives among the blossoms, and prevents the possibility of their further developement. The stop thus put to the ordinary course of vegetation must early have excited the attention of all who take delight in the "innocent flower," and hence we find—

> ——"the bud bit with an envious worm
> Ere he can spread his sweet leaves to the air,
> Or dedicate his beauty to the same"—
> (*Romeo and Juliet*, Act I. Sc. I.)

has been a favourite object of comparison. In the mouth of Viola it becomes one of the most touching images that poet ever employed:

> "She never told her love;
> But let concealment, like a worm i' the bud,
> Feed on her damask cheek."
> *Twelfth Night*, Act II. Sc. I.

In many other passages "the worm" is either alluded to, or mentioned, as "the canker." Thus, when Laertes is cautioning Ophelia against

> "Hamlet and the trifling of his favour," (*Act I. Sc. III.*)

his words are—

> "The canker galls the infants of the spring,
> Too oft, before their buttons be disclosed."

Among the enumeration given by Titania of the duties of her fairy attendants—

> "To kill cankers in the musk-rose buds,"
> (*Midsummer Night's Dream*, Act II. Sc. III.)

holds a prominent place; and when in the opening scene of the "Two Gentlemen of Verona," Protheus is defending himself against the raillery of his friend Valentine, the image which he employs is skilfully turned against himself.

> "*Protheus.* Yet writers say, as in the sweetest bud
> The eating canker dwells, so eating love
> Inhabits in the finest wits of all.

Valentine. And writers say, as the most forward bud
Is eaten by the canker ere it blow,
Even so by love, the young and tender wit
Is turn'd to folly: blasting in the bud,
Losing his verdure even in the prime."—*Act I. Sc. I.*

The *larvæ* yet mentioned are all of them destructive in some degree to our property, either to that species of property comprised in the vegetable kingdom, or that which constitutes the raiment of our persons, or the furniture of our apartments; and so far they are all represented as injurious to man. One, however, is casually introduced, whose labours may be considered as outweighing, by the advantages they produce, the injuries which all the others may occasionally inflict. It is the larva of a moth. The produce of its cocoon was at one period considered so valuable, as to be estimated in Imperial Rome at its weight in gold, and even now it gives employment to many thousand individuals, and forms an important branch of our national manufactures. You no doubt suspect already that the insect to which I allude is the silkworm. Othello, in the celebrated scene where he demands "the handkerchief," venerated as the dying gift of his mother, and endowed with supernatural virtues by "an Egyptian," mentions the insect thus:—

"The worms were hallow'd that did breed the silk."
Act III. Sc. IV.

In two passages Shakspeare mentions a nut with no kernel. In the first passage the words are employed figuratively, to denote the absence of real worth in the character of Parolles—

> " There can be no kernel in this light nut."
> *All's Well that Ends Well*, Act II. Sc. V.

In the other they are used to imply a want of understanding.

> " *Thersites.* Hector shall have a great catch if he knock out either of your brains: 'a were as good crack a fusty nut with no kernel."—*Troilus and Cressida*, Act II. Sc. I.

There is nothing in those extracts to indicate that Shakspeare was cognizant of

> " The red-capped worm that's shut
> Within the concave of a nut;"—(*Herrick's Hesperides.**)

but that he was so, is apparent from the phrase in As You Like It, " as concave as a worm-eaten nut," (Act III. Sc. IV.), and also from the passage in which he describes the equipage of Queen Mab—

> " Her chariot is an empty hazel nut,
> Made by the joiner squirrel, or old grub,
> Time out of mind the fairies' coachmaker."
> *Romeo and Juliet*, Act I. Sc. IV.

The " old grub " here mentioned by the poet as causing the vacuity in the shell, is the larva of a weevil

* Quoted by Kirby and Spence, vol. i. p. 309.

(Balaninus nucum). The mother is furnished with a long horny beak, and while the nut is yet soft, drills a hole through the shell, deposits an egg, and thus furnishes its future offspring with a house for its defence, and food for its support.

, A branch of the filbert tree; a, perforation of the weevil; b, extremity of the nut; c, exit hole of the grub; B, *the grub;* C, *the pupa;* D, *the perfect insect.*

In the passages already quoted, the word worm is not applied to the object to which we usually give the name, the common earth-worm *(Lumbricus terrestris)*, but to the larva of some species of insect. It is in this sense that the word is almost invariably employed by Shakspeare. Thus, when Hamlet says, "your worm is your only emperor for diet," the meaning of the word worm is evident from the remainder of the passage—"We fat all creatures else to fat us, and we fat ourselves for maggots."

In one instance, however, the word worm denotes some species of venemous reptile; for Cleopatra asks the countryman who brings her "the aspick," "Hast thou the pretty worm of Nilus here, that kills and pains not?" and some commentators have attributed a similar meaning to the words used by the disguised duke when addressing Claudio:

> "Thou art by no means valiant,
> For thou dost fear the soft and tender fork
> Of a poor worm."—*Measure for Measure*, Act III. Sc. I.

In this opinion I for one do not concur. It seems to be more probable that in this instance, and in the line,

> "Worm nor snail do no offence,"—
> (*Midsummer Night's Dream*, Act II. Sc. III.

the common earth-worm, which truly belongs to the class Vermes, is the creature alluded to. The word worm occurs again in the enumeration by the witches in "Macbeth," of "the ingredients of our cauldron." But here the "blind-worm's sting" is obviously intended to apply to the *Anguis fragilis*, or blind-worm of Great Britain, a reptile which, I believe, is not found in Ireland. I saw it some years ago, for the first time, in that part of Scotland—

> "Where Loch Vennachar in silver flows."

I shall not at present dwell longer on the notice

taken by Shakspeare of insects ere they assume their perfect form. Enough has been adduced to show that he was aware of their changes, and familiar with the appearance and economy of those belonging to very different orders. But as you may perhaps wish to hear something of the powers occasionally exercised in this part of the kingdom by those diminutive and apparently contemptible beings, I shall send you shortly some notes respecting their ravages.

After I have thus "showed you all the qualities o' the isle," you remain at perfect liberty to abjure Entomology, should it appear to you

"Weary, stale, flat, and unprofitable."

"Where the bee sucks there suck I."

TEMPEST, ACT V. SC. I.

HAVING now, my dear friend, glanced at the destructive powers exercised by the caterpillars of insects, we are prepared for entering on some considerations relative to their economy and habits. But I must trespass a little longer on your patience, to bring before you in one connected view an important point in their physical organization. Some tribes of insects, as you well know, are rapacious, and live by the destruction of those which are less powerful than themselves. Some, like "the worm

i' the bud," feast on the petals of flowers, and others revel on the nectar of our choicest fruits. By their numbers, their varied powers, and their diversified instincts, they exert a prodigious influence on the economy of Nature. This influence depends in many instances on the structure of those organs by which they provide themselves with nourishment, joined of course to those peculiar instincts invariably accompanying each particular formation of the mouth. I propose, therefore, in my present letter to confine myself to a slight sketch of the oral apparatus with which insects are furnished, an apparatus which undergoes an astonishing number of modifications. In fact, on a minute scrutiny, we find throughout all the insect tribes the same admirable adaptation of means to an end which has so frequently been pointed out in the various organs of quadrupeds and birds. The flexile trunk of the elephant, the graceful neck of the giraffe, the talons and strength of the eagle, the migratory powers of the swallow, are not better adapted to their wants and capabilities, than are the instruments by which insects take their respective food. It becomes, therefore, a pleasing inquiry to ascertain what structure of mouth belongs to each order of insects; by what habits that structure is accompanied, and by what changes in those habits every alteration in the structure of the mouth is at-

tended. Nor is this an inquiry unconnected with the well-being of man, or far removed from his pursuits. When we are told that about seventy years ago a species of ant appeared in the Island of Grenada in such infinite hosts as to put a stop to the cultivation of the sugar cane; that the government of the country offered a reward of twenty thousand pounds to any person who should discover an effectual mode of destroying them; and that many domestic quadrupeds, together with rats, mice, reptiles, and even birds, fell a prey to their attacks, we very naturally inquire by what *means* could an insect, so insignificant, produce effects so important? * When we read of locusts innumerable as flakes of snow, so rapacious as to devour every green thing, and attended in their progress by pestilence and famine, we ask, With what instruments of destruction can they be provided? How are they rendered capable of exerting a power so terrific? A glance at the formation of their mouths, and a moment's reflection on their bodily powers, and the myriads which make their appearance together, will solve the question.

I shall not at present enter into any details of the habits of different insects: these I reserve for description at some future time, taken in connection with the passages in which they are noticed by the Bard

* Kirby and Spence, vol. i. p. 182.

of Avon. But as insects belonging to seven different orders are mentioned in the plays of Shakspeare, I desire at present to convey to you an idea of the diversified structure observable in their mouths. For this purpose I shall endeavour not "to bestow my tediousness upon you" at greater length than the proposed object requires, and shall accordingly use only such quotations as are necessary to show that the insect I name is one of those recorded.

For the introduction of scientific terms I make no apology. To one acquainted with the languages from which they are derived, those terms convey more distinct and definite ideas than any English words. But even if you were not so, I would still adopt the same course; because I feel convinced that the difficulty of comprehending the meaning, and learning the signification, of a scientific term, is far more than counterbalanced by the accurate ideas with which it is ever afterwards connected in the mind of the student; and I have had occasion to regret that in some recent publications the authors have made use of English words in a manner not only very perplexing, but calculated to convey inaccurate, and even erroneous ideas.

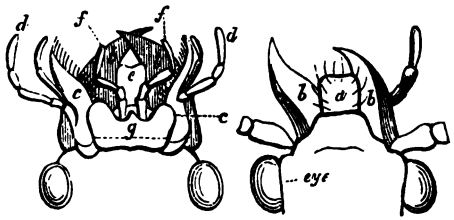
Few persons have examined the mouth of an insect; even those who have suffered from its attack are ignorant of the structure of the weapon by which

the wound has been inflicted. All the animals, the birds, the fishes, which we are in the habit of meeting, have a mouth composed of an upper and lower jaw, and the motion appears to be *vertical*. The mouth in insects is totally different: many have two upper jaws and two under jaws, and in these the motion is *horizontal*.

In the first order of insects *(Coleoptera)*, to which the "sharded beetle" belongs, the several parts of the mouth are more distinct than in many of the other divisions. Beetles, therefore, of which this order is composed, are said to have more perfect mouths than gnats, moths, or butterflies. It is not meant that any real imperfection attaches to the mouth of a gnat, or of a butterfly; on the contrary, we know that each "is perfect after its kind;" but by using the word perfect, I merely mean to say that each of the several parts of the mouth in the beetle tribes is more fully developed than in some of the other orders, where some parts are considerably enlarged, and others exist only as rudiments, or else are altogether wanting.

A perfect mouth consists of seven parts: and will perhaps be better understood by a reference to the accompanying figure. The mouth consists, as in all masticating insects, of an upper lip, *labrum* (*a*); a pair of horny jaws, moving horizontally, called

mandibles (*b*); two other jaws, *maxillæ* (*c*), of a less firm consistence, bearing a *palpus* or feeler (*d*); and lastly a lower lip, *labium* (*e*), furnished with a pair of *palpi* (*f*), and implanted upon a broad, horny, basal piece, which is termed the chin, or *mentum* (*g*).



The upper and lower lip and the tongue are so analogous to the corresponding parts in the vertebrate animals, that I need not say any thing respecting their uses. With the jaws the case is widely different.

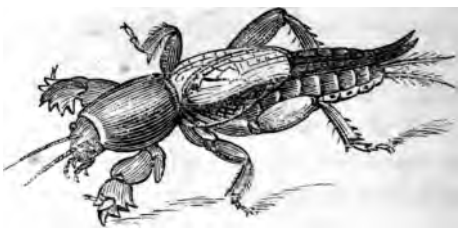
The mandibles or upper jaws are situated on each side and immediately under the labrum or upper lip. The office of mastication peculiarly belongs to them. In some genera they are powerful instruments, of a hard substance like horn; but in "the shard-borne beetle" they are soft and membranous. A corresponding change is observable in the habits of the insects. The former are cannibals, and live

by rapine; the latter are scavengers, and subsist on the dung of quadrupeds. The mandibles are generally armed with teeth, and those teeth are divided into

Geotrupes stercorarius.

incisive, laniary, and molary, as in the Mammalia, they are not, however, fixed into the mandibles, but form an actual part of those organs. Underneath the mandibles are the maxillæ, placed one on each side of the labium. They are occasionally employed in lacerating the food, but their primary use seems to be to hold and preserve it from falling, while the mandibles are employed in its laceration. In looking at the mouth of a beetle, you will probably observe some parts which I have not yet named. These are not essential, like those I have already mentioned. They are termed Palpi, and have a trivial appellation, derived from the peculiar part of the mouth to which

they are attached: when they spring from the maxillæ, they are termed Maxillary Palpi; when they are attached to the lower lip, they are called Labial Palpi. Much difference of opinion has existed as to their functions, but the most general belief now is, that they are really what their name denotes, "feelers."



Mole Cricket, Gryllotalpa vulgaris.

"As merry as crickets," is the comparison made use of by Poins in one of his frolics with the Prince, at the Boar's Head Tavern. This merry insect belongs to a different order, Orthoptera, and exhibits in its mouth seven parts as distinct as those of the Coleoptera, but somewhat different in form. The mandibles are strong, and admirably adapted for cutting vegetable substances, on which the greater part of the order subsists; and in this insect the tongue is more perfectly developed than in the beetle, where it can scarcely be said to exist as a distinct organ.

The insects I have yet named employ their mandibles for cutting, or for macerating their food. In the next division the mandibles supply the place of tools for plastering, for digging, for sawing, and for cutting, and the food on which the insect subsists is obtained, not by maceration, or by suction, but simply by lapping. This is effected by a tongue well fitted for the purpose, and protected by a sheath of a singular construction from injury when not in use. The insect I have selected as the representative of this order is one with which you have long been familiar, and from whose labours you have in more ways than one derived gratification. It seems so busy and so happy that the delicate Ariel found no stronger image to denote his own enjoyment than the expression—

> "Where the bee sucks, there suck I."
> *Tempest*, Act V. Sc. I.

Strictly speaking, the bee does not suck the honey from flowers, but collects it by means of his tongue, which is furnished with a contrivance for that purpose, not unlike a brush, or a round plate, fringed with hair. If we hold a bee by its wings, the mouth at first sight appears to consist only of a small transverse lip, and a pair of strong jaws, having a lateral motion, as in fig. 1. On further examination, however, a flattened instrument of a shining brown colour

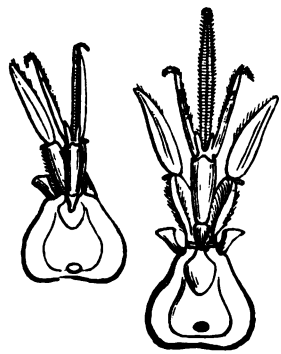
is perceived, extending from the lip to the throat: this is the tongue, and at the pleasure of the bee it

The Bee's Tongue.

can be projected forward, either in a straight or curved form, as in figs. 2 and 3.

I wish much I could exhibit to you some magnified drawings in my possession, by which the singular structure of this organ would be illustrated; but as this is impossible, I must content myself with mentioning, that the tongue in the Coleopterous and Orthopterous orders was apparently of trifling importance; but in the order Hymenoptera, it becomes the most conspicuous and remarkable part of its curious oral apparatus. The mandibles are powerful, as in the other tribes, but a new and complex piece of mechanism has been added. The tongue, furnished with numerous muscles, and protected by sheaths when

not in use, is unfolded and darted instantaneously into the blossom of a flower, sweeps up the nectar which it finds, and consigns it to the honey bag. It is then sheathed with the same rapidity, retracted in part into the mouth, and the remainder doubled up under the chin and neck, until again called into



The Bee's Mouth magnified.

active service. This tongue is so admirably fitted for "visiting every corner of the nectaries of flowers," that it has been supposed bees can obtain their contents without being obliged to use their mandibles, for cutting a passage into the blossoms. This, however, is not always the case. The testimony of two very accurate observers leaves no doubt on my mind

that bees do pierce the corollas of some flowers to obtain their honey. Doctor J. L. Drummond, the talented author of "First Steps to Botany," and President of our Natural History Society, tells me that he has repeatedly seen them piercing the common Comfrey *(Symphytum officinale)* for this purpose; and Mr. Wyndman, another of my fellow members, and one who has paid considerable attention to Entomology, had the pleasure of seeing one of our wild bees *(Bombus muscorum)* busily engaged last

a, Mandible of the male, and b, of the female, Humble Bee.

summer, in the Botanic Garden here, piercing the bell-shaped corollas of the Irish heath *(Menziesia polifolia)*, and on examining the plants, found, to his great surprise, there was scarcely a blossom of the heath which had not thus been perforated.

The passages in which the working bees are mentioned by Shakspeare are so numerous, that I prefer

directing your attention to them at a future time to doing so now, when I am merely mentioning the construction of their mouths. The working bees are not, however, the only ones alluded to. In the "Midsummer Night's Dream," when Bottom, the weaver, in the character of an ass,

"With amiable cheeks and fair large ears,"

is giving orders to his new attendants, he makes use of the following words:—

"Monsieur Cobweb, good Monsieur, get your weapons in your hand, and kill me a red hip'd humble bee on the top of a thistle; and good Monsieur, bring me the honey bag."—*Act IV. Sc. I.*

Drones are also noticed; for Shylock, in speaking of his servant Launcelot, (whom he had parted with to Bassanio because he "would him help to waste his borrowed purse,") after describing him as "a huge feeder," "snail slow in profit," adds, "drones hive not with me." But as the drone, the ant, to which the fool in King Lear threatens to send Kent to school, and "injurious wasps," partake of the same general structure, so far as the mouth is concerned, I shall not detain you with a description of any minute difference between them.

Shakspeare, above all other writers, seems to possess a plastic power of moulding every object of

nature to his will, of constructing the little and the great alike to do his "spiriting gently," of finding

> "tongues in trees, books in the running brooks,
> Sermons in stones, and good in every thing."
> *As You Like It*, Act II. Sc. 1.

The butterfly supplies him with many images pregnant with instruction, and grouped with an expression and variety, which no artist could embody, who did

not, like our great Poet, possess an equal knowledge of the conduct and the heart of man. Thus it is introduced in the reflection of Achilles, when the Grecian lords, in "Troilus and Cressida," pass by him, and "either greet him not or else disdainfully"—

> ——"What the declined is
> He shall as soon read in the eyes of others,
> As feel in his own fall; for men, like butterflies,
> Show not their mealy wings but to the summer."
> *Act III. Sc. III.*

"The gentle Desdemona," when beseeching the senate that she might accompany the Moor to

Cyprus, applies to herself the epithet "a moth of peace." I must not venture to quote all the various passages in which butterflies and moths are mentioned, but shall at once proceed to point out the peculiar formation of mouth which the Lepidoptera possess.

"The innumerable tribes of moths and butterflies," of which the order is composed, "eat nothing but the honey secreted in the nectaries of flowers, which are frequently situated at the bottom of a tube of great length. They are accordingly provided with an organ exquisitely fitted for its office — a slender and tubular tongue, more or less long, sometimes not shorter than three inches, but spirally convoluted when at rest, like the main-spring of a watch, into a convenient compass. This tongue, which they have the power of instantly unrolling, they dart into the bottom of a flower, and, as through a syphon, draw up a supply of the delicious nectar on which they feed."* I have called it a tongue, but strictly speaking it is not so. It is an organ of a cartilaginous substance, consisting of innumerable rings, and composed of three distinct tubes, through the centre one of which the honey alone is conveyed. This central one appears to be formed by the grooves of the lateral tubes, hooked together in the same

* Kirby and Spence, vol. i. p. 395.

manner as the laminæ of a feather, and capable of being united into an air-tight canal, or of being instantly separated, at the pleasure of the insect.

The formation of mouth we have now been considering is totally different from that of the Coleoptera, or Hymenoptera, formerly described. The mandibles have undergone a change: they no longer appear as powerful instruments for seizing or for cutting; and the maxillæ exhibit a still greater metamorphosis, and have become converted into the curious tubular apparatus through which the honey is imbibed. I do not of course mean that the maxillæ of the butterfly were ever like those of the beetle: by the word metamorphosis, I merely mean that a difference is observed, and not that the one ever becomes converted into the other. These maxillæ are very singular in their structure, and you can, by taking a pin, and applying it to those of any butterfly, satisfy yourself that it is composed of two distinct tubes. Now, a question naturally arises, of what use are the two outer tubes, when the central one formed by their union is the only one through which the fluid passes? To explain the *cui bono* of any point in animal physiology is, in our imperfect state of knowledge, a difficult undertaking; but I am inclined to think that they are of service in protecting the central one from the pressure of the

atmosphere. If a vacuum were formed in the tube, and it were not strengthened by this contrivance, the sides might be pressed together, and the honey prevented from ascending to the mouth of the insect. This I throw out merely as a suggestion, the truth or falsehood of which I would wish you to prove by observation. If it be a "baseless fabric," the sooner it be "dissolved" the better.

The next order of insects, the Diptera, or two-winged flies, are frequently mentioned. Titus Andronicus rebukes his brother Marcus for killing a fly during a repast:—

> "Poor harmless fly!
> That with his pretty buzzing melody
> Came here to make us merry, and thou hast kill'd him."
> *Act III. Sc. II.*

> "The common people swarm like summer flies,
> And whither fly the gnats but to the sun?"
> (*Act II. Sc. VI.*)

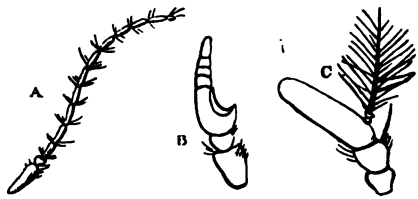
is the reflection of the wounded Clifford in "Henry the Sixth."

> "My brave Egyptians all
> Lie graveless till the flies and gnats of Nile
> Have buried them for prey,"—(*Act III. Sc. XI.*)

are the words of Cleopatra.

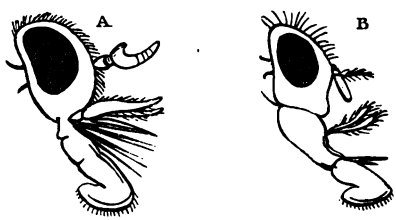
These extracts sufficiently indicate that Shakspeare was familiar with the habits of some of the many genera comprised in this order. To the different formation of their mouths I would now wish to

direct your attention; but I find it impossible to convey to you, without the aid of magnified drawings,



A, *Antennæ of the Tipulidæ*—B, *of Tabanus*—C, *of Musca.*

a precise idea of the variations in structure which they exhibit. They have, however, one common character; they are formed for imbibing food by suction; of this the common fly is perhaps the most familiar example. In other genera, as in that to which the "small grey-coated guat" belongs, the labrum, mandibulæ, maxillæ, and lingua, become converted into a series of sharp and delicate instruments, which not only pierce the skin, but form a tube for the passage of the blood on which they live.



A, *Mouth of Tabanus*—B, *of Musca.*

It is supposed, and not without good reason, that they have the power of instilling a poison into the wound, which has the effect of rendering the blood more fluid, and better adapted for suction.

Insects of the order Hemiptera abstract the juices of plants and animals by means of an instrument of a construction altogether different. To this order the bug *(Cimex lectularius)* belongs; but it is a singular fact, and one which shows that this disgusting visitant must have been comparatively little known in the days of "good Queen Bess," that although the word bug occurs on five or six different occasions in Shakspeare's Plays, it is in every instance synonymous with bugbear, and does not designate the insect. Thus Petruchio, unawed by the description of the "wild cat" Catharine, scornfully exclaims to the lovers of Bianca: "Tush, tush! fear boys with bugs;" and when Leontes, inflamed with groundless jealousy against Hermione, bids her "look for no less than death," her reply contains the same word in precisely a similar sense:—

> ——"Sir, spare your threats,
> The bug which you will fright me with I seek."
> *Winter's Tale*, Act III. Sc. I.

It is not so, however, with another, to which you would be most likely to apply the words of Jaques—

> ——"let 's meet as little as we can."
> *As You Like It*, Act III. Sc. II.

The insect I allude to, is that mentioned by Dame Quickly in describing the death of Sir John Falstaff, "'A saw a flea sticking upon Bardolph's nose." In this order *(Aphaniptera)* the mandibles appear like two little plates: the maxillæ and tongue assume the form of lancets, and the labrum and palpi are altogether different.

One insect still remains, belonging to the order Aptera; but I shall let Shakspeare himself introduce it to your notice. The passage I shall quote is from the opening scene of the "Merry Wives of Windsor," in which Justice Shallow, Slender, and Evans are holding forth on the importance of Shallow and his family, on his being "a gentleman born," and writing himself "Armigero:"—

"*Shallow.*—Ay, that I do, and have done so any time these three hundred years.

Slender.—All his successors gone before him have done it, and all his ancestors that come after him may: they may give the dozen white luces in their coat.

Shallow.—'Tis an old coat.

Evans.—The dozen white louses do become an old coat well: it agrees well passant; it is a familiar beast to man, and signifies love."

Swammerdam, who died in 1681, is the latest naturalist I have heard of, who has paid any attention to the structure or anatomy of the genus. His words are, "The louse has neither beak, teeth, nor any kind of mouth, as Doctor Hook described it, for the

entrance into the gullet is absolutely closed; in place of all these, it has a proboscis, or trunk, or, as it may be otherwise called, a pointed and hollow aculeus or sucker, with which it pierces the skin, and sucks the human blood, taking it for food into the body."—*Book of Nature*, p. 33.

Now, my dear Arnold, cast a retrospective glance over the various formations of mouth which I have described. In the *Coleoptera*, the powerful jaws of the predaceous beetles (formidable weapons of attack!), and the softer texture of the organs in those tribes, which live on substances in a state of decay. The strong mandibles of another order (*Orthoptera*), adapted to the cutting of their appropriate vegetable food. The various modifications of these instruments, in the extensive genera of the order *Hymenoptera*, giving to them the capability of being used as spades, saws, augers, trowels, &c., and the new and important offices which are performed by the tongue. The change which is apparent when we advance to the butterfly (*Lepidoptera*), and examine the flexible siphon, through which its nectareous nutriment is imbibed. The singular and varied structure exhibited in the gnat or the fly (*Diptera*), and so fitted for the suction of their liquid food. The still further modifications presented by the lancets and the sucker of the remaining orders (*Aphaniptera*

and *Aptera*), and by the total absence of parts which in others had held a conspicuous place. Contrast this diversity of structure with the comparative uniformity observable among the higher animals. Consider, too, how admirably each set of organs is adapted to the peculiar food on which the insect lives; what infinite skill, what minute, yet beautiful mechanism, they respectively exhibit, and you will admit that Entomology may have many a sentiment of humble admiration and wonder— many a devout and unpremeditated outpouring of devotional feeling laid upon her shrine; and that the words which Cleomenes employed when speaking of Delphos would not in the present instance be inapplicable;

"The air most sweet"— "the temple much surpassing
The common praise it bears."—*Winter's Tale*, Act III. Sc. I.

"The shard-borne beetle, with his drowsy hums,
Hath rung night's yawning peal."

MACBETH, ACT III. SC. 2.

FROM caterpillars of the several kinds mentioned by Shakspeare, and from the consideration of the various forms of the mouth observable among insects, we now advance to their habits and most remarkable peculiarities. I hope that the "gentle dulness" which may have pervaded many parts of my former letters will now be dispelled, and that you may become interested in attending to the working of those various instincts with which the beings we are considering have been endowed. So

wonderful and admirable are their operations that Bonnet says, "When I see an insect working at the construction of a nest or a cocoon, I am impressed with respect, because it seems to me that I am at a spectacle where the supreme Artist is hid behind the curtain."

The first insect I shall mention, and the one to which I shall confine myself in my present letter, is the common dor, or clock or blind beetle, which flies in the summer's evenings, and occasionally startles us by striking against our faces or our persons. This circumstance has been accurately described by Collins:—

> "Now air is hushed save ——
> —— where the beetle winds
> His small but sullen horn;
> As oft he rises, midst the twilight path,
> Against the pilgrim borne in heedless hum."
>
> *Ode to Evening.*

Gray has most happily depicted, in his well-known elegy, the circumstances under which it appears. The flocks are returning from pasture, the husbandman from his toil, the landscape is fading "on the sight," and the air is still,

> "Save where the beetle wheels his droning flight."

The remarkable sound which accompanies its flight has been frequently noticed.

"The beetle's drowsy distant hum" is mentioned in one of Hogg's songs, as singing the lullaby of the departing day, and is again described in his amusing little poem "Connel of Dee."

> "The beetle began his wild airel to tune,
> And sang on the wynd with an eirysome croon,
> Away on the breeze of the Dee."
>
> *Vol. II. p.* 119.

The beetle's hum is recorded by Crabbe among

> ——"the sounds that make
> Silence more awful."

Shakspeare has introduced it with the happiest effect into his "Macbeth."

> ——"Ere the bat hath flown
> His cloister'd flight; ere to black Hecate's summons
> The shard-borne beetle, with his drowsy hums,
> Hath rung night's yawning peal, there shall be done
> A deed of dreadful note."
>
> *Macbeth*, Act III. Sc. II.

And here I may be permitted to remark, that a very slight knowledge of Natural History may occasionally assist us, in understanding the description of such authors as record what they themselves have noticed. The beetle is furnished with two large membranaceous wings, which are protected from external injury by two very hard, horny wing cases, or, as entomologists term them, elytra. The old English name was "shard," and this word was

introduced into three of Shakspeare's plays. Thus, in his "Antony and Cleopatra,"—

> "They are his shards, and he their beetle;"
> (*Act III. Sc. II.*)

and in "Cymbeline,"—

> "Often to our comfort do we find
> The sharded beetle in a safer hold
> Than is the full-wing'd eagle."—*Act III. Sc. III.*

These shards or wing cases are raised and expanded when the beetle flies, and by their concavity act like two parachutes in supporting him in the air. Hence the propriety and correctness of Shakspeare's description, "the shard-borne beetle," a description embodied in a single epithet. I do not mean to assert that the word shard has not other meanings; in fact, it is employed by Hamlet in its primitive English signification—a piece of broken tile; for the priest says of Ophelia,

> "Shards, flints, and pebbles should be thrown on her."
> *Act V. Sc. I.*

I only deny that any of its other meanings should be used in the present instance. The one most applicable is that given by Mr. Tollet, as quoted in the notes to Ayscough's edition of Shakspeare, that "shard-born beetle is the beetle born in cow-dung; and that shard expresses dung is well known in the

north of Staffordshire, where cow's shard is the word generally used for cow-dung." But it is not so likely that Shakspeare was acquainted with the stercoraceous nidus of the insect, as that he observed the peculiarity of its flight, assisted by its expanded elytra; and if the word at the time he lived had both meanings, I hope you will acknowledge the one I have given to be the more probable. Should you, however, feel disposed to enter more fully into a question of the kind, I would refer you to a long and very interesting note published in the Zoological Journal, No. XVIII. p. 147.

The dor, or blind beetle (*Geotrupes stercorarius*), belongs to the Linnæan genus *Scarabæus*. The antennæ are composed of several little plates strung together at one edge; these, when the insect reposes, are closely applied to each other, but they diverge when it moves, and thus expose the papillary surface to the air. It belongs to one of the numerous tribes of insects which feed on organized matter in a state of decay, and thus assist in preserving the general salubrity of the earth. From their mode of life the word "saprophaga," signifying literally, as you know, "devourers of filth," has become the name by which the family is distinguished. Mr. MacLeay, so well known among modern naturalists as the proposer of the quinary system of classification,

states that it was the peculiar interest which the *Scarabæus sacer* of Linnæus excited as being a principal among the many objects "qualia demens Ægyptus coluit," that first led him to investigate the natural history of the insect. His father's cabinet contained one thousand eight hundred species of scarabæi, and thus supplied him with an inducement to commence the study, and with the means for its successful cultivation.

The sacred scarabæus, which first led MacLeay to the study of Entomology, differs in some of its habits from our most common native scarabæi, although belonging to the same Linnæan genus. Its image sculptured on many of the Egyptian monuments affords a melancholy proof of the superstition which reigned in a country where the arts flourished and science found an abode. The insect is still common in Egypt, and excites by its habits the surprise of all who have only been accustomed to see the common dor of these countries. Doctor Clarke says, "Upon the sands around the city of Rosetta we saw the Scarabæus pilularius, or rolling beetle, [it is now more properly termed the Scarabæus sacer,] as it is sculptured on the obelisks and other monuments of the country, moving before it a ball of dung, in which it deposits an egg. Among the Egyptian antiquities preserved in the British Museum is a

most colossal figure of this insect. It is placed upon an altar, before which a priest is represented kneeling. The beetle served as food for the Ibis. Its remains are sometimes discovered in the earthenware repositories of those embalmed birds which are found at Saccara and Thebes. With the ancients it was a type of the sun. We often find it among the characters used in the hieroglyphic writing. As this insect appears in that season of the year which immediately precedes the inundation of the Nile, it may have been so represented as a symbol of the spring, or of fecundity, or of the Egyptian month anterior to the rising of the water. The ancient superstitions with regard to it are not wholly extinct, for the women of the country still eat this beetle in order to become prolific."*

In Denon's splendid work on Egypt, I find the following passage, which bears directly on the subject of our present inquiry :—" Scarabées, emblêmes de la sagesse, de la force, de l'industrie : son image se trouve partout, ainsi que celle du serpent ; il occupe la place la plus distinguée dans les temples, non seulement comme ornement, comme attribut, mais comme objet de culte."—Vol. II. p. 60.

"The subject admits of further illustration by reference to Plutarch.† According to him, soldiers

* Travels, vol. iv. p. 8. † Plutarch de Iside et Osiride, cap. x.

wore the image of the beetle upon their signets; and this, perhaps, may account not only for the number of them found, but also for the coarseness of the workmanship."*

The unrolment of a mummy in the Royal College of Surgeons, London, on the 16th of January, 1834, afforded another example of the superstitious feelings connected with the scarabæus among the ancient Egyptians. From the mythological characters painted on the cases, the nature of the colours employed, &c., it was ascertained that the body was that of an incense-bearing priest, of the temple of Ammon, at Thebes. "An amulet of various-coloured stones was on the breast, and lower down a scarabæus, about an inch in length, in jade or other hard substance."—*Lit. Gaz.*, No. 887.

The habits of the beetle at Rosetta, described by Doctor Clarke, are similar to those of many individuals of the same family,—among them to one which I have found about the base of the Mourne mountains, county of Down, in spring (*Geotrupes vernalis*). This insect is said to deposit its egg in a ball, prepared for that purpose, and rolled in the manner already described; but in districts where sheep are kept it wisely saves its labour, and ingeniously avails itself of the pellet-shaped balls of dung which

* Travels, vol. iv. p. 8.

those animals supply, and which are admirably adapted for its purpose.* The dor or blind beetle adopts a different course of proceeding; and it must excite our admiration of the infinite wisdom with which every part of the economy of nature is ordered, to observe that the method employed by the female to secure a proper nidus for her eggs, serves "to second, too, another use." She makes a large cylindrical hole, often of considerable depth, and in it she deposits her eggs, surrounded by a mass of dung, in which they have been previously enveloped. Here the labour of the insect ceases; the developement of her young is secured, and their sustenance provided. But the advantage resulting from her toil does not terminate. The manure, which is positively injurious to vegetation when lying in a mass, is not only dispersed, but it is buried at the roots of the adjoining plants, thus contributing considerably to the fertility of our pastures, and, consequently, to the well-being of all those animals who depend on these pastures for their support.

Spring is in general far advanced before the dor beetle appears, so that we usually regard it as a summer visitant: an occasional one, however, ventures to come forth at an earlier period, for in the

* Sturm, Deutschlands Fauna, i. 27, quoted by Kirby and Spence, vol. ii. p. 475.

spring of 1834, I recognized the insect on the evening of the 11th of March, in the immediate vicinity of Belfast.

I have often been amused, on taking the common dor beetle, at observing the manner in which it feigns death. Its legs are set out perfectly stiff and immoveable, which is its posture when really dead, and, no matter how much it is tossed about in the hand, it will not, by the slightest movement, betray its stratagem. The only way to restore its activity is to allow it to remain for a minute or two undisturbed. It is said by this procedure to deceive the rooks, which feed upon it, but which do so only when their captive is alive. A curious example of a similar instinct in birds is given in the "Time's Telescope" for 1833:—"A gentleman had a corncrake brought to him by his dog: it was dead to all appearance. As it lay on the ground he turned it over with his foot: he was convinced that it was dead; standing by, however, some time in silence, he suddenly saw it open an eye. He then took it up; its head fell, its legs hung loose, it appeared again totally dead. He then put it in his pocket, and before very long he felt it all alive, and struggling to escape. He took it out: it was as lifeless as before. He then laid it upon the ground, and retired to some distance; in about five minutes it

warily raised its head, looking round, and decamped at full speed."

The dor beetle, in common with many others, is occasionally infested with minute parasitic insects, termed acari. In my cabinet at present I have one of the rapacious beetles (*Carabidæ*) so covered with these parasites, that the real colour of the beetle is no where visible, not even on the legs. I was witness, in 1831, on the Malone road, near this town, of an ingenious device, which the dor beetle employed to get rid of its tormentors. It alighted on a heap of hardened dirt, folded up its wings with its usual rapidity, then forced its way twice through the mass, and while the acari which were thus brushed off, were running about in great apparent confusion, it hurried from their vicinity and effected its escape.

The great strength of these beetles in comparison with their size is a peculiarity deserving of notice. If one is taken in the hand, it will in a very short time force its way out in despite of our utmost pressure. Catesby, in his "Carolina," states that "Doctor Brichell was supping one evening in a planter's house of North Carolina, when two of them were conveyed without his knowledge under the candlesticks. A few blows were struck on the table, when, to his great surprise, the candlesticks began to move about, apparently without any agency;

and his surprise was not much lessened when, on taking one of them up, he discovered that it was only a chafer that moved."

This fact must have been known to Sir Walter Scott, for in "Peveril of the Peak," in the scene where Julian Peveril and Geoffry Hudson are imprisoned together, the dwarf says, "The least creatures are oftentimes the strongest. Place a beetle under a tall candlestick, and the insect will move it by its efforts to get out; which is, in point of comparative strength, as if one of us should shake his Majesty's prison of Newgate by similar struggles."

We are generally in the habit of seeing but one or two of these insects at a time, but on some occasions they appear in considerable numbers. Mr. Knapp, in his "Journal of a Naturalist," states that one evening his attention was called to them in particular, by the passing of such a number as to constitute a little stream. "I was led," he continues, "to search into the object of their direct flight, as in general it is irregular and seemingly inquisitive. I soon found that they dropped on some recent nuisance: but what powers of perception must these creatures possess, drawn from all distances and directions by the very little fœtor which in such a calm evening could be diffused around! and by what inconceivable means could odours reach this beetle,

so as to rouse so inert an insect into action! But it is appointed one of the great scavengers of the earth, and marvellously endowed with powers of sensation, and means of effecting the purpose of its being."*

The same elegant writer remarks, "The perfect cleanliness of these creatures is a very notable circumstance, when we consider that nearly their whole lives are passed in burrowing the earth, and removing nuisances; yet, such is the admirable polish of their coating and limbs, that we seldom find any soil adhering to them. The meloe, and some of the scarabæi, upon first emerging from their winter's retreat, are commonly found with earth clinging to them; but the removal of this is one of the first operations of the creature, and all the beetle race, the chief occupation of which is crawling about the soil and such dirty employs, are, notwithstanding, remarkable for the glossiness of their covering and freedom from defilement of any kind. But purity of vesture seems to be a principal precept of nature, and observable throughout creation."†

It is obvious from the various circumstances now mentioned, that this humble beetle and its congeners have been objects of interest to many cultivated minds. They have furnished our poets with imagery, which will live with our "land's language." They

* Page 319, third edition. † Page 321.

have formed a subject for the ingenuity of learned commentators. They have demanded the notice of the historian, and the inquiry of the antiquarian: and their various instinctive actions have supplied a theme for the admiration of the naturalist. If, in the present imperfect state of our knowledge, and with our attention directed to only one of their most obvious external characteristics, they have been found thus interesting, what delight should we not feel if we could follow the complexity of their internal organization, and develope the laws, on which their production, their growth, and their preservation, essentially depend!

"Oh! I do fear thee, Claudio; and I quake,
Lest thou a feverous life should'st entertain,
And six or seven winters more respect
Than a perpetual honour."

MEASURE FOR MEASURE, ACT III. SC. I.

After mentioning the best-known individual of all those included under the term "beetles," I now proceed to notice one of the most important divisions of the insects belonging to the same order *(Coleoptera)*. I allude to those which, instead of subsisting on decayed vegetable and animal substances, are predaceous in their habits, and live on animal food *(Adephaga)*. The principal part of their subsistence

is derived from the flesh of the smaller insects which they are able to overcome, and they seize as booty any recent animal matter which chance may throw in their way. They are so constantly foraging about for provisions, so incessantly running across our paths, that they must occasionally be trampled to death.

Hence "the poor beetle that we tread upon" probably belongs to the tribe forbidden by the fairies to come near the sleeping Titania :—

"Beetles black, approach not here."

Almost every stone during spring and summer forms a covering for some of these insects, as you have no doubt observed on many occasions. So numerous are the individuals comprised in some of the families into which they are divided, that of one very common kind *(Carabidæ)*, Curtis states we have two hundred and seventy-five British species. All of these are complete cannibals in their habits, and sometimes by their rapacity disappoint the inexperienced collector. On one occasion, when I was from home on an entomological excursion, I put three of them into a box together until I had an opportunity of plunging them into hot water, the most expeditious method of killing them. In about an hour I returned to the house, and found, to my disappoint-

ment, that two of them had overpowered the third, had eaten the body, and were then deliberately picking out the fragments of flesh which still adhered to the horny covering.

"The poor beetle that we tread upon" must not, however, be passed by with so cursory a notice. The precise meaning which in this passage the Poet intended to convey would indicate to us what was Shakspeare's opinion of the sensibility of insects compared with that of man, and this in our present researches it is important to ascertain. The passage in which these words occur, is introduced in "Measure for Measure."

> ——"the poor beetle that we tread upon
> In corporal sufferance finds a pang as great
> As when a giant dies."—*Act III. Sc. I.*

Numerous, indeed, are the observations to which those lines have given rise. It is usually asserted that the Poet meant to say, "the corporal sufferings of a giant are great, and those of a beetle when trodden under foot are as great." If this be so, the Entomologist who kills an insect for his cabinet, occasions the same amount of actual suffering he would do, were he to put one of his fellow-creatures to death. Were this the case, I for one would abjure a pursuit so fraught with cruelty, and bury my entire collection "deeper than e'er plummet sounded." But, before I say

"Othello's occupation's gone," let us examine more closely the words which Shakspeare employs, and the circumstances under which they are used. Claudio is in a dungeon, from which the compliance of his sister Isabella with the terms of the viceroy would set him free. She dreads his fear of death may overcome his sense of honour, and that he may urge her, as in fact he eventually does, to adopt that remedy which "to save a head" would "cleave a heart in twain." Under this apprehension she speaks :—

> "Oh! I do fear thee, Claudio; and I quake,
> Lest thou a feverous life should'st entertain,
> And six or seven winters more respect
> Than a perpetual honour. Darest thou die?
> The sense of death is most in apprehension;
> And the poor beetle that we tread upon
> In corporal sufferance finds a pang as great
> As when a giant dies."

When the latter part of the sentence is separated from the preceding lines, it appears to convey such a picture of the sufferings of "the poor beetle," that many have, on this passage, brought a charge of cruelty against all persons devoted to Entomological pursuits. Such a charge, ignorance alone could suggest. "There are few instances of a more complete perversion of the meaning of a poetical quotation than occurs in this passage of Shakspeare. The object of the fair pleader being to encourage her

brother stedfastly to encounter death, would scarcely have been forwarded by depicting that consummation as attended with great corporal sufferance. Yet such is the effect of the omission of the context!"*

The Rev. Mr. Bird, after observing, that even "Shakspeare is not an oracle on all points," remarks, "It is somewhat amusing that his words should, in this case, be entirely wrested from their original purpose. His purpose was to show how little a man feels in dying; that 'the sense of death is most in apprehension, not in the act; and that even a beetle, which feels so little, feels as much as a giant does.' The less, therefore, the beetle is supposed to feel, the more force we give to the sentiment of Shakspeare."†

To these extracts I shall make no addition; for additional argument might well appear "wasteful and ridiculous excess." The ungrounded charge has, I hope, been triumphantly refuted.

Beetles are mentioned by Shakspeare only in the two passages already quoted, and amid the imprecations of Caliban against the majestic Prospero—

> "All the charms
> Of Sycorax, toads, beetles, bats, light on you."
> *Tempest*, Act I. Sc. II.

None of these imply, on the part of Shakspeare,

* Note by E. T. Bennett.—*Zoological Journal*, No. xviii. p. 196.

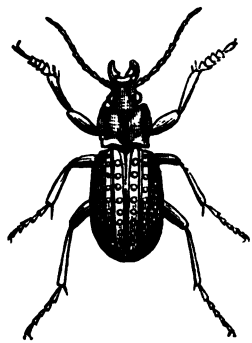
† On the Want of Analogy between the Sensations of Insects and our own.—*Entomological Magazine*, No. ii. p. 113.

a knowledge of the variety of their kinds. This is what might be expected; for even Ray's celebrated work, "Historia Insectorum," published near a century after the death of our own great poet, was written, according to Haworth, in "the dark ages of science." We must not, therefore, demand from Shakspeare a knowledge beyond that of the age in which he lived. Perhaps, if the state of science at that time had been different, it would still have made little, if any, change in him. He would probably have exerted, as he did, his habits of quick and accurate observation, but would not have courted the assistance which science only can afford. In this respect he might have resembled many gifted individuals of the present day, who, with all the facilities which they possess of acquiring knowledge, have never devoted a little time to learn how they might discriminate one insect from another; how they might distinguish those living things, by which, in every place and at all seasons, they are surrounded.

Perhaps no stronger proof can be adduced of the "plentiful lack" of information which prevails on this subject, than that which the state of our language affords. Try but to indicate by English words the first half-dozen of the most common beetles you meet in a country ramble, and you will

find yourself unable to do so. In fact, their various species, their habits, and their economy, are to the generality of people alike unknown. Yet these are the phenomena which will make your love of Entomology "grow by what it feeds on." So numerous are the different species of beetle, and many of them so local in their habitation, that no one who pays attention to the subject for any length of time, can fail to procure either what is extremely rare, or else altogether unknown. I well recollect the pleasure I experienced, when I procured, on the shore of Lough Neagh, at Shane's Castle, specimens of *Blethisa borealis* and *Bembidium paludosum*, insects which had not before been taken in this neighbourhood, and which I believe had not previously been recorded as Irish. In my cabinet I have at present one of our most brilliant native insects, the *Carabus nitens*, a species which approaches in the splendour of its decoration to the diamond beetle of tropical climates. This insect was taken, along with *Carabus clathratus*, on Birkie bog, about five miles from this town. This bog is so divested of those heaths and blossoms which lend beauty to the waste and colouring to the landscape, that when the very extreme of sterility or nakedness is to be expressed, the country people in the vicinity invariably say, "as bare as Birkie." Yet here, on this bleak, barren, and un-

cultivated waste, the Entomologist finds one of his richest and most valuable captures. As the Knight



Carabus clathratus.

in Undine sees the forest glades peopled beneath his feet, and rich with countless heaps of gold, so the Entomologist finds, 'mid the bleak and sterile soil, treasures which no eye less gifted than his own can witness.

The mention of *Carabus nitens* reminds me of another beetle of a more agile form, and of scarcely inferior decorations,—*Cicindela campestris*. Its colour is a golden green, with white or yellow spots, and appears peculiarly rich when the insect is running rapidly along in the bright sunshine of a summer day. You would not, when it first attracted your attention by the beauty of its form and colouring,

be aware that you are looking on one of a family justly named by Linnæus the tigers of the insect tribes. "Though decorated with brilliant colours, they prey upon the whole insect race; their formidable jaws, which cross each other, are armed with fearful fangs, showing to what use they are applicable; and the extreme velocity with which they can either run or fly, renders hopeless any attempt to elude their pursuit. Their larvæ are also equally tremendous with the imago."* I have in my cabinet specimens of the insect from the county Wicklow, and from the Trosachs, at Loch Katrine; but it has not yet been observed in the neighbourhood of this town. I hope you will be able to detect its presence in your locality.

But perhaps, like Miranda, "I prattle something too wildly;" so I shall now return once more to Shakspeare. Although the word beetle occurs only in the passages I have quoted, he has elsewhere noticed, under a different name, an individual which belongs to the same order. I allude to the glow-worm (*Lampyris noctiluca*), an insect rich in poetic associations, and well deserving of the epithet "earth-born star," bestowed upon it by Wordsworth. It is happily introduced by Titania, where she enumerates to

"Pease-blossom! Cobweb! Moth! and Mustard-seed!"

the fairy-like services which they were to render to

* Kirby and Spence, vol. i. p. 268.

the "gentle mortal," "sweet bully Bottom," with whom, in consequence of the potent spell laid on her by Oberon, she has become "much enamoured."

> "Steal from the humble bees,
> And for night tapers crop their waxen thighs,
> And light them at the fiery glow-worms' eyes."
> *Act III. Sc. I.*

This passage has been thus censured by Doctor Johnson:—"I know not how Shakspeare, who commonly derived his knowledge of Nature from his own observation, happened to place the glow-worm's light in his eyes, which is only in his tail." To this, Mason has replied, that "the blunder is not in Shakspeare, but in those who have construed too literally a poetic expression;" and adds, "Surely a poet is justified in calling the luminous part of the glow-worm the eye: it is a liberty we take in plain prose; for the point of greatest brightness in a furnace is commonly called the eye of it." *

Hoping you will agree with Mr. Douce, that Dr. Johnson's objection has "been skilfully removed by Mr. Monck Mason," I shall give you, in the words of that celebrated antiquarian, the meaning of Shakspeare's most appropriate epithet "uneffectual," in the passage from Hamlet,

> "The glow-worm shews the matin to be near,
> And 'gins to pale *his* uneffectual fire."—*Act I. Sc. V.*

* Comments on the last edition of Shakspeare's Plays, p. 12.

"It was," he remarks, "uneffectual only at the approach of morn, in like manner as the light of a candle would be at mid-day."*

If you have ever seen the glow-worm, you may be unable to account for the soft wingless creature you behold being classed with the Coleoptera; but it is in the male you are to look for the expansive wings, and the horny wing-covers or elytra, which form some of the characteristics of the order. The female crawls upon the ground,—the male wings his flight

Male and female Glow-worm.

through the air. The light of the former is beautiful and brilliant; that of the latter, comparatively inconspicuous,—a fact of which Shakspeare does not appear to have been cognizant.

It has been poetically supposed, that the light may be regarded as a "nuptial lamp," hung out to guide the male glow-worm to the society of the female;

* Illustrations, p. 192.

an idea which has been happily embodied by Moore, in the following lines :—

> "For well I knew the lustre shed
> From my rich wings, when proudliest spread,
> Was in its nature lambent, pure
> And innocent as is the light,
> The glow-worm hangs out to allure
> Her mate to her green bower at night."

That this theory is not altogether fanciful, has been proved; for "Olivier frequently caught the males, by holding the females in the palm of his hand."* The light perhaps serves some important purpose in the economy of the glow-worm; for it has been noticed before the insect has assumed its perfect form, and while it was yet in the nympha, and even in the larva state.

In that admirable "Introduction to Entomology," to which I have on more than one occasion already referred, I find the following passage relative to the insect now under consideration :—

"If, living like me in a district where it is rarely met with, the first time you saw this insect chanced to be, as it was in my case, one of those delightful evenings which an English summer seldom yields, when not a breeze disturbs the balmy air, and "every sense is joy," and hundreds of these radiant worms, studding their mossy couch with mild effulgence, were pre-

* Entomologia Edinensis, p. 206.

sented to your wondering eye in the course of a quarter of a mile, you could not help associating with the name of glow-worm the most pleasing recollections." *

The glow-worm is not found in this neighbourhood; nor, so far as I have heard, has it yet been noticed in any part of Ireland. The first and only time I met with it, was in Scotland, towards the end of the summer of 1824, and amid circumstances very different from those described. With three friends, I had started at an early hour from the vicinity of Loch Katrine, walked over to the "Clachan o' Aberfoil," and sauntered along the romantic shores of Loch Ard, places which the pen of Sir Walter Scott has converted into classic ground. Delighted with the picturesque grandeur of the scenery, we neglected to note the "fleeting hours of time," and found ourselves, before we had gained the western side of Ben Lomond, benighted and without a guide. The morass abounded with deep fissures, which it required the utmost circumspection to avoid. Weary, hungry, and fearing every moment the result of some unlucky step, we descended the mountain. It was now eleven o'clock, and part of the descent yet remained to be accomplished; when all at once, on a shelving

* Kirby and Spence, vol. ii. p. 410.

rock and on the adjoining heather, we saw for the first time the "mild effulgence" of the glow-worm. No one exclaimed with Evans, "Twenty glow-worms shall our lanthorns be;" but the mind of each was roused by a new and interesting object: we felt pleased, cheered, invigorated,—pushed on with renovated spirit, and about midnight reached the little inn of Rowardennan.

Let me now transport you by my "so potent art," from the shores of Loch Lomond to the bank of some murmuring rivulet, where

> "He makes sweet music with the enamell'd stones,
> Giving a gentle kiss to every sedge
> He overtaketh in his pilgrimage;"
> (*Two Gentlemen of Verona*, Act. II. Sc. VII.)

and while you stray along the margin, and watch the streamlet, as

> "by many winding nooks he strays,
> With willing sport to the wild ocean;"

let me beg your attention to some of the insects which sport upon the surface of the calm and quiet pools where it reposes in its course, and ask you in the words of Hamlet,

> "Dost know this water-fly?"

You will find on a second glance that they are not all of the same kind, and that some of them belong

to the order Coleoptera. They are beetles less in size than those we have been considering, and dwelling not on the land, but in the water. On a sunny day, they may be seen on almost every pool, gliding with ease and rapidity in ceaseless circles, dimpling the glassy surface of the water, diving when disturbed, and carrying down with them a bubble of air shining like quicksilver. It would be difficult to say why Shakspeare uses the word water-fly as a term of reproach, and still more so, to ascertain if this little whirlwig was the insect alluded to. One of my fellow members has suggested that the ephemeræ may be meant, as they fling off their pupa case with extreme rapidity, assume a new form, and exist for so brief an interval. But this conjecture, although ingenious, would scarcely be applicable to the passage in "Troilus and Cressida,"

"Ah! how the poor world is pestered with such waterflies, diminutives of nature!"—*Act V. Sc. I.*

Nor would it agree with the manner in which the word is employed by Cleopatra, who, indeed, uses one term, now restricted to the flesh flies:—

——"Rather on Nilus' mud
"Lay me stark naked, and let water-flies
Blow me into abhorring."
Antony and Cleopatra, Act V. Sc. III.

Another of our members has supposed, with greater probability, that the Poet referred to some of the smaller gnats, whose dimensions and habits of annoyance would alike be legitimate subjects of allusion, in the mouth of Thersites, that "crusty botch of nature." If, however, it will not be admitted, that insects which pass their first stages in the waters are those alluded to, but that those only can be meant who are found there in their perfect state, the *Gyrinus* may be the one, although I can scarcely see in what way so frolicsome a little fellow can be branded with the term "pestered." It is possible, however, for none of the water insects seem to be more generally known. Mr. Knapp has justly remarked, "This plain, tiny, gliding water-flea, seems a very unlikely creature to arrest our young attention; but the boy with his angle has not often much to engage his notice; and the social, active parties of this nimble swimmer, presenting themselves at these periods of vacancy, become insensibly familiar to his sight, and by many of us are not observed in after-life, without recalling former hours."* I may, therefore, be justifiable in introducing to your notice this very amusing little insect, the *Gyrinus natator*, whose social little parties can scarcely be regarded without pleasure. It was

* Journal of a Naturalist, p. 318, 3rd ed.

my good fortune, on one occasion, to observe an individual of a different species in an unusual situation—the inhabitant of a freshwater shell (*Limneus peregeri*). When the shell was taken out of the pool, its mouth was filled with what appeared a mass of clay, but proved to be a fragment of some aquatic plant of suitable length, the space between it and the margin of the aperture being filled with slime. The interior of this mass was lined with a soft, whitish, silky substance, which extended to the edge of the aperture. The "hollow-wreathed chamber" of the shell was occupied by a living individual of *Gyrinus villosus*, an insect which, I believe, had not previously been taken in this neighbourhood. Its habits are solitary, being the very reverse of those of its merry little congener, the *Gyrinus natator*. Your observation would, perhaps, ascertain if those species undergo their transformation in different situations,—if the one is always to be found beneath the water, while the cocoon of the other is suspended to the stem of some aquatic plant. Or you could, perhaps, prove, that in the present instance the insect, when about to undergo its transformation, had probably taken advantage of an empty shell which chance had thrown in its way, and had thus been saved the trouble of constructing the customary

cocoon. Should this be so, it would furnish an interesting instance of that adaptation to circumstances which "man, proud man," is apt to regard as the concomitant and characteristic of reason alone, and would show that in the deviations of instinct, no lesr than in its ordinary operations, we may trace an UNSEEN HAND.

"Her waggon spokes made of long spinner's legs,
The cover of the wings of grasshoppers,
The traces of the smallest spider's web,
The collars of the moonshine's watery beams,
Her whip of cricket's bone."

ROMEO AND JULIET, ACT I. SC. IV.

Such is the description of Queen Mab's equipage, a description now quoted, as in it the two insects which form the subject of my present letter, are both casually mentioned. The Grasshopper and the Cricket, for it is to those I allude, belong to the order Orthoptera. Both are insects known to every one by the sense of hearing, as well as that of sight. They

are not regarded with aversion, like some of the beetle tribe; but are looked upon with feelings of forbearance, if not of kindliness, by all who have listened to their song. I have not, therefore, to bespeak your indulgence, while I transcribe from my note-book "the trivial fond records" relative to these insects,

> "That youth and observation copied there."

The grasshopper is a universal favourite;

> "He is an evening reveller, who makes
> His life an infancy, and sings his fill;"

and the ease of his movements, the extent of his spring, the variety of his colours, and the attractive nature of the objects among which he is found, all tend to increase his popularity. His song and his activity have both been noticed by Hogg, and introduced with pleasing effect in one of his minor poems, the Address to a Wild Deer:—

> "Elate on the fern branch the grasshopper sings,
> And away in the midst of his roundelay springs."

Wordsworth has not passed unheeded the

> "jocund voice
> Of insects chirping out their careless lives
> On these soft beds of thyme-besprinkled turf."

But I shall not at present dwell on these poetic sketches; and as the cricket is an inhabitant of our

houses, while the grasshopper is a dweller out of doors, I shall principally confine my observations to the former insect (*Acheta domestica* Lin.), and to others of the same genus.

In this part of the country, it is a common belief that the appearance of crickets in a house is a good omen, and prognosticates cheerfulness and plenty. That this opinion is generally entertained, may be inferred from the manner in which it has been embodied by Cowper, in his Address to the Cricket

"Chirping on his kitchen hearth."

His words are,—

"Wheresoe'er be thine abode,
Always harbinger of good." *

"There needs no ghost from the grave, to tell us" that the error is a very common one, which attributes the actions of many of the inferior animals not to causes actually in operation, but to "coming events," which thus "cast their shadows before," and of which these actions are the certain forerunners. Yet the notion, although prevalent, is altogether unfounded, and is opposed to every thing which either reason or observation teaches us concerning their habits. When swallows fly low, skimming along the ground or water, they are said to foretell a change

* Translated from Vincent Browne.

of weather: but the fact is, the change has at that time commenced. Swallows feed upon insects, and alter their flight according to the different situations of their prey. Insects, in common with many of the inferior animals, appear to possess a nice perception of changes in the atmosphere, which our feelings are not sufficiently sensitive to detect. They feel the change, and they act on that feeling. We do not feel it; and are hence led into the error of supposing that their actions prognosticate a "coming event," when, in truth, they denote the existence of a series of meteoric phenomena, which has not only commenced, but is then actually in operation. To apply this remark to the subject under consideration—crickets take great delight in the warmth of a kitchen hearth, and they feast on yeast, crumbs of bread, milk, gravy, and all the waste and refuse of the fireside. Their presence, therefore, does not denote that plenty is to come, but that it already exists, and they should, consequently, be regarded as the attendants, not as the harbingers, of comfort and abundance. Their domicile about our kitchen hearth is not always unaccompanied by damage; for occasionally they gnaw holes in clothes which may be drying at the fire. This is done, not to revenge, as is commonly said, the injuries which the proprietor of these clothes has inflicted upon their tribe, but to gratify their thirsty

palates with the moisture which the clothes at that time contain.

To most people, the chirp of the cricket is, as Cowper has aptly expressed it, "full of mirth," and conveys to the mind the idea of a perfectly happy being. Thus, Poins in reply to the Prince's question—"Shall we be merry," makes use of this simile, "as merry as crickets." The learned Scaliger took such a fancy to their song, that he was accustomed to keep them in a box in his study. The Spaniards, we are told by Osbeck, confine some insects of an allied genus in cages, for the sake of their song.* "It is reported, that in some parts of Africa the common house crickets are kept and fed in a kind of iron oven, and sold to the natives, who like their chirp, and consider it a great soporific." †

In our own country, they have been repeatedly noticed by those poets who describe things which they themselves have seen or heard, and particularly as connected with cheerfulness and mirth. Thus, Rogers, in his delightful poem of "Italy," addressing a being conceived by nature in "her merriest mood, her happiest," adds,

> "At thy birth the cricket chirp'd, Luigi,
> Thine a perpetual voice, at every turn
> A larum to the echo."

* Osbeck's Voy. i. 71, quoted by Kirby and Spence, vol. ii. p. 401.
† Mouffet, Theatrum Insect. 136, (quoted in Insect Mis. p. 82.)

Cowper, if his own opinion coincides with that of Bourne, from whom he translates, did not deem it unworthy of

"Such a song as he could give;"

and considers it superior to the grasshopper:—

"Thou surpassest, happier far,
Happiest grasshoppers that are;
Their's is but a summer song,
Thine endures the winter long,
Unimpair'd, and shrill and clear,
Melody throughout the year."

Yet Milton did not consider this mirth inconsistent with contemplation; for "il Penseroso" desires to be

"Far from all resort of mirth,
Save the cricket on the hearth."

It is remarkable that, notwithstanding the accordance, thus generally admitted, of the chirp of the cricket with gaiety and mirth, it is occasionally employed by our poets in scenes of a completely opposite character. Its fitness for such scenes may be inferred from the manner in which it is introduced in Wharton's "Pleasures of Melancholy":—

—"Far remote
From mirth's mad shouts, that through the illumined roof
Resound with festive echo, let me sit,
Blest with the lowly cricket's drowsy dirge."

Lady Macbeth, in replying to the question of her husband after the murder of Duncan, says—

"I heard the owls scream, and the crickets cry."

In the play of "Cymbeline," where, at midnight, Iachimo commences his survey of the chamber where Imogen lies sleeping, his first words refer to the chirping of crickets, rendered audible by the repose which at that moment prevailed throughout the palace :—

> "The crickets sing, and man's o'er-labour'd sense
> Repairs itself by rest."—*Act II. Sc. II.*

And in Hogg's "Pilgrims of the Sun," "the cricket's call" is introduced into one of the most solemn passages in the poem—the part where Mary, in her shroud and funeral vestment, returns to Carelha.

> "A dim haze shrouded every sight,
> Each hair had life, and stood upright;
> No sound was heard throughout the hall,
> But the beat of the heart, and the cricket's call."

But the song of the cricket has done more than supply material to the poet for heightening the effect of his mirthful or his tragic scenes. On one occasion, if we may credit the historian, the song of an insect of this genus was the means of saving a vessel from shipwreck. The incident evinces the perilous situation of Cabeza de Vara, in his voyage towards Brazil, and is related by Dr. Southey in his history of that country :—

"When they had crossed the Line, the state of the

water was inquired into, and it was found, that of a hundred casks there remained but three, to supply four hundred men and thirty horses. Upon this, the Adelantado gave orders to make the nearest land. Three days they stood towards it. A soldier, who set out in ill health, had brought a grillo, or ground-cricket, with him from Cadiz, thinking to be amused by the insect's voice; but it had been silent the whole way, to his no little disappointment. Now, on the fourth morning, the grillo began to sing its shrill rattle, scenting, as was immediately supposed, the land. Such was the miserable watch which had been kept, that upon looking out at the warning, they perceived high rocks within bow-shot; against which, had it not been for the insect, they must inevitably have been lost. They had just time to drop anchor. From hence they coasted along, the grillo singing every night, as if it had been on shore, till they reached the island of St. Catalina."*

The cricket does not pass its entire existence about our hearths. Like other denizens of the town, it delights occasionally to take an excursion during the summer, and at such times may be heard singing its vesper song in company with another species, which is always a denizen of the fields (*Acheta campestris*). The Rev. Gilbert White, in his delightful

* "Penny Magazine," November 3, 1832.

"Natural History of Selborne," has made both species the subject of some observations, written in that pleasing and unostentatious spirit by which all his writings are pervaded :—"Sounds do not always give us pleasure according to their sweetness and melody, nor do harsh sounds always displease." We are more apt to be captivated or disgusted with the associations which they promote, than with the notes themselves. "Thus, the shrilling of the field-cricket, though sharp and stridulous, yet marvellously delights some hearers, filling their minds with a train of summer ideas, of every thing that is rural, verdurous, and joyous." *

The same author remarks, "they are so shy and cautious, it is no easy matter to get a sight of them ; for, feeling a person's footsteps as he advances, they stop short in the midst of their song, and retire backward nimbly into their burrows, where they lurk until all suspicion of danger is over."

It is not, however, the "feeling" of an approaching step, indicated by the vibratory motion of the ground, which alone possesses the power of stilling their chirping : any tolerably loud sound will produce a similar effect. This fact has been established by modern observations on the habits of insects ; but as it has been recorded by the Ettrick Shepherd, in his

* Page 349, ed. 1837.

romantic tale of Mary Scott, I shall give his verses precedence, on the principle mentioned by Tasso —

——" che 'l vero condito in molli versi
I piu schieri allettando ha persuaso."

"The warder lists with fear and dread
For distant shout of fray begun;
The cricket tunes his tiny reed,
And harps behind the embers dun.

"Why does the warder bend his head,
And silent stand the casement near?
The cricket stops his little reed,
The sound of gentle step to hear."

One example may perhaps be deemed sufficient to show that the circumstance mentioned at the conclusion of the last verse is correct. "Brunelli, an Italian naturalist, kept several of the field-crickets in a chamber. They continued their crinking song through the whole day; but the moment they heard a knock at the door, they were silent. He subsequently invented a method of imitating their sounds, and when he did so outside the door, at first a few would venture upon a soft whisper, and by and bye, the whole party burst out in chorus to answer him; but upon repeating the rap at the door, they instantly stopped again, as if alarmed. He likewise confined a male in one side of his garden, while he put a female in the other at liberty, which began to leap as soon as she heard the crink of the male, and imme-

diately came to him,—an experiment which he frequently repeated with the same result." *

Those facts show that Linnæus and Bonnet were incorrect in denying that insects can hear at all; and that Shakspeare has evinced his usual accuracy of discrimination, when he says, in the "Winter's Tale,"

> "I will tell it softly;
> Yon crickets shall not hear me."
> *Act II. Sc. I.*

After so many quotations descriptive of the song of the cricket, shall I be credited when I state, that he has no song, in our acceptation of the term,—that is, no peculiar note, produced, like the human voice, or the song of birds, by the modulation of vocal organs, or by air expelled from the mouth? And yet, the chirp of the cricket, the drowsy hum of the beetle, the buzzing of the fly, the humming of the bee, are all sounds produced without, what may be properly termed, voice.

In the beetle, they are probably caused by the friction of the wing-cases (*elytra*) at the base of the wings, throwing them into a strong vibratory motion. Some species of grasshoppers effect a similar object, by rubbing the elytra with the right and left legs

* Comment. Instit. Bonon., vii. 199, &c. apud Lehmann. Quoted by Rennie, Insect Miscellanies, p. 77.

alternately; and the loudness of the sound is augmented by a deep cavity on each side of the body, in which there is a drum, or little membrane, in a state of tension. In the cricket, the apparatus consists of strong nervures or rough strings in the wing-cases, by the friction of which against each other a sound is produced, and communicated to the membranes stretched between them. The males only are gifted with these musical powers, and as the little areolets into which their wing-cases are divided are larger than those in the female, they present, under the microscope, an interesting subject for observation.

To you, my dear friend, I shall not attempt to enumerate the various passages scattered throughout the Holy Scriptures, in which grasshoppers are mentioned. I shall only remind you of the fact, that these insects, along with locusts and beetles, are among the animals allowed to be eaten under the Mosaical dispensation. The words in which the permission is conveyed are striking to the Entomologist, as showing that three species of insects belonging to the order (*Orthoptera*) now under consideration, were recognized as distinct. The words occur in Leviticus (chap. xi. ver. 20—23.)

"20. All fowls that creep, going upon all four, shall be an abomination unto you.

"21. Yet these may ye eat, of every flying, creeping thing which goeth upon all four, which have legs above their feet, to leap withal upon the earth.

"22. Even these of them may ye eat. The locust after his kind, and the bald locust after his kind, and the beetle after his kind, and the grasshopper after his kind.

"23. But all other flying things which have four feet shall be an abomination unto you."

To the insect emphatically distinguished as *the* locust, and whose ravages have been among the most awful visitations of other lands, I find no allusion throughout the Dramatic Works of Shakspeare. In fact, the word "locust" occurs but once, and then is introduced in such a manner as to show it is the vegetable production that is meant. "Fill thy purse with money," says Iago to Roderigo; "the food that to him now is as luscious as locusts, shall be to him shortly as bitter as coloquintida."

As, in these countries, we happily enjoy an exemption from the devastation occasioned by these insects, you will, perhaps, not be prepared to expect, that twenty-three species of locust are now enumerated as British. The last specimen which I believe has been recorded,* is one which was exhibited at a meeting of our society, and was captured by Miss Ball, at Ardmore, county of Waterford, Sept. 1835. It was of a species first described by Mr. Curtis, and named Locusta Christii, after Wm. Christy, esq., by

* Curtis's Illustrations of British Entomology, Aug. 1836, p. 608.

whom it had been taken in a garden near London, in July, 1826.

Grasshoppers do not when in a state of freedom appear to attack their own kindred, although they do so when they are confined together. Being desirous of ascertaining if a similar propensity prevailed among crickets, I took four, and confined them for eighteen hours without food, yet no one among them inflicted the slightest injury on his fellow-prisoners. I gave them their freedom; and on the succeeding day took six others, differing very much

Blatta orientalis, Male and Female.

in apparent size and strength, and kept them in a glass for forty hours, yet the same result precisely

took place. To put the question of their cannibalism to a still more conclusive test, I next took two crickets and two cockroaches (*Blatta orientalis*), and confined them for eighty hours in a similar manner; at the expiration of that period they were all living and active, and had not suffered from any attack on each other.

During the time these unfortunate crickets were in confinement, I observed that they repeatedly tried to climb up the sides of the glass, but always in vain, falling backwards at each successive attempt. This appeared to me singular, as I had watched a grasshopper (*Locusta grossa*) walking up the glass pane of a window, and I knew no reason why crickets should not be able to do the same. But to reason from analogy, is a very uncertain mode of arriving at just conclusions in Natural History. I believe it is Dr. Fleming who remarks, that no person from seeing the fallow-deer feeding on graminivorous plants, could ever have imagined from analogy, that the reindeer fed upon a lichen. The conclusion I drew respecting the cricket, was as erroneous as the analogical inference in the other case would have been, and it showed me the propriety of subjecting every thing relating to the economy of insects to the test of personal observation, so far as circumstances will permit of our doing so. On examining, there-

fore, with a microscope, the foot of the cricket, to ascertain if in this respect there was any difference in structure, I found it perfectly smooth, and terminating in a double hook; but that of the grasshopper was not only furnished with a hook, but likewise with three cushions or suckers. This formation enables us to explain how it takes hold of the stems of grass when it springs, and also how its hold is retained. In such a situation, it has attracted the eye of the poet already quoted, and been thus described:—

> "The grasshopper sits idle on the stalk
> With folded pinions, and forgets to sing."

Before quitting this part of my subject, I may mention, that the insect so celebrated by the Grecian bards, under the name Tettix, is not a grasshopper, as the word is commonly translated, but belongs to a totally different order (*Homoptera*). With the peculiar covering in which one insect of this order is at a certain period enveloped, you are doubtless familiar. I allude to the little frothy appearance so frequently seen on plants during the summer months, and known by the common appellation of cuckoo-spit. It is an exudation proceeding from the larva of *Tettigonia spumaria*, which by this contrivance obtains, at the same time, concealment from its various enemies, and protection from the vicissitudes of weather.

Of the musical cicadas, one species has been discovered in England. Like its classic congener, it belongs to the same family as the clamorous catydids of North America, and is distinguished in Entomology by the term Cicada, the very word which is employed by Virgil,—

"Cantu querulæ rumpent arbusta cicadæ."—*Geor.* III. 328.

The conclusion of Byron's notice of the grasshopper, while he chirps "one good-night carol more," has been already quoted; that of the cicada should likewise be brought before you, to show the accuracy with which he has distinguished the one insect from the other:—

"The shrill cicadas, people of the pine,
Making their summer lives one ceaseless song."

The Athenians, as you are aware, wore in their hair golden images of this insect. To excel it in singing, was the highest commendation of a singer; nor was it considered derogatory to the orator to be compared to the cicada. Instead, however, of any longer bestowing "my tediousness upon you," I shall reward your present attention by transmitting a very spirited Ode of Anacreon, addressed to this insect, and which has been very happily translated:—

"Happy Cicada, perch'd on lofty branches,
Deep in the forest, cheerful as a monarch,
Tasting the dew-drops, making all the mountains
Echo thy chirping.

"Thine is each treasure that the earth produces;
Thine is the freshness of each field and forest;
Thine are the fruits, and thine are all the flowers,
Balmy spring scatters.

"Husbandmen fondly dote upon thy friendship,
Knowing thee guiltless of a thought to harm them.
Thee, mortals honour, sweet and tuneful songster,
Prophet of summer.

"Thee, all the Muses hail a kindred being;
Thee, great Apollo owns a dear companion:
Oh! it was he who gave that note of gladness,
Wearisome never.

"Song-skilful, earth-born, mirth and music loving;
Fairy-like being, free from age and suffering;
Passionless, and pure from earth's defilement,
Almost a spirit.

"Drunk with the dew-drop, perch'd on twig so lofty,
Noisy Cicada, o'er the wild wave sounding,
Saw-like the feet which to thy side thou pressest,
Drawing sweet music."*

* Entomological Magazine.

"They have a king and officers of sorts,
Where some, like magistrates, correct at home;
Others, like merchants, venture trade abroad."

HENRY V., ACT I, SC. II.

In addressing these letters to you, my object is not to eulogise the writings of Shakspeare, but to bring before you the habits of such insects as he has named; at least, so far as may be necessary for the elucidation of the passages in which they occur. Justly does he remark —

"'Tis seldom when the bee doth leave her comb
In the dead carrion;"—(*Second Part Hen. IV.*, Act. IV. Sc. IV.)

an observation which will naturally recall to your mind the passage in which we learn from the Scrip-,

ture, that Samson found "a swarm of bees and honey in the carcase of the lion." But, seldom as any thing of the kind does occur in this kingdom, it did happen on one occasion in the county of Down, if some species of wasp has not been mistaken for bees. The fact is recorded in the following words, extracted from the *Belfast News Letter*, of Friday, 10th August, 1832:—

"A few days ago, when the sexton was digging a grave in Temple Cranney (a burying-place in Portaferry), he came to a coffin which had been there two or three years: this he thought necessary to remove, to make room for the corpse about to be interred. In this operation, he was startled by a great quantity of wild bees issuing forth from the coffin, and upon lifting the lid, it was found that they had formed their combs in the dead man's skull and mouth, which were full. The nest was made of the hair of the head, together with shavings that had been put in the coffin with the corpse."

Every hive contains a queen, drones, and workers; of these different kinds, Shakspeare seems cognizant. Thus the lines—

> "Like stinging bees in hottest summer's day,
> Led by their master to the flowered fields"—
> (*Titus Andronicus*, Act V. Sc. I.)

recognize the first:

> "Drones hive not with me,"

the second; and any of the numerous passages

describing their labours, show his knowledge of the third.

—"So work the honey bees;
Creatures, that, by a rule in nature, teach
The art of order to a peopled kingdom.
They have a king and officers of sorts,
Where some, like magistrates, correct at home;
Others, like merchants, venture trade abroad;
Others, like soldiers, armed in their stings,
Make boot upon the summer's velvet buds,
Which pillage they with merry march bring home
To the tent royal of their emperor;
Who, busied in his majesty, surveys
The singing masons building roofs of gold;
The civil citizens kneading up the honey;
The poor mechanic porters crowding in
Their heavy burdens at his narrow gate;
The sad-eyed justice, with his surly hum,
Delivering o'er to executors pale
The lazy yawning drone."—*Henry V.*, Act I. Sc. II.

Such is the splendid description given by Shakspeare of the economy of a bee-hive,—a description poetical in the highest degree, and pleasing alike to the ear and the imagination. In it, without apparent effort, we have a rich and glowing picture. The artist, with his accustomed skill, has "o'erstepped not the modesty of nature;" and yet the simile is sustained, animated, and vigorous throughout.

It is the queen bee, you are aware, that seems to regulate the industry and preserve the equilibrium of the denizens of the hive; and to her, Shakspeare, like the ancients, invariably applies a male epithet. When by any accident she is destroyed, the social

compact appears for a time to be dissolved, anarchy and disorder succeed to the former regular and systematic exertion, and a strange and fiery excitement pervades the population. Most correctly, therefore, does Shakspeare introduce the comparison,

> "The commons, like a hive of angry bees
> That want their leader, scatter up and down."
> *Second Part Henry IV.*, Act III. Sc. II.

The drones, it is now well known, are the males of the community, destroyed by the workers when no longer required; but preserved uninjured while the welfare of the hive requires the continuance of their existence. It is, perhaps, to the slaughter of the drones, which takes place towards the end of summer, that the Poet alludes in the figurative expression,

> "The sad-eyed justice, with his surly hum,
> Delivering o'er to executors pale
> The lazy yawning drone."

There is nothing in the writings of Shakspeare to imply that he was aware of the precise nature of the functions of the drone-bees; nay, on one occasion, he introduces the word "drone" in a manner that must be regarded as incorrect:—

> "Drones suck not eagle's blood, but rob bee-hives;"
> (*Second Part Henry VI.*, Act IV. Sc. I.)

the robbery being a crime of which they cannot be accused, although it may justly be charged against

wasps, with whom they have, perhaps, in this passage, been confounded. Milton's notice is not perfectly accurate either; for he throws the feeding of the drones, and the forming of the cells, on the queen, and not on the workers; or, if he mean the working bee, the term "husband" is inapplicable.

——"Swarming, next appeared
The female bee, that feeds her husband drone
Deliciously, and builds her waxen cell
With honey stored."—*Par. Lost*, Book VII.

The immortal author of "Paradise Lost" has in another passage, without derogating from the grandeur or beauty of his theme, sung

——"how the bee,
Sits on the bloom, extracting liquid sweet."

Perhaps nothing can convey a better idea of the joyous feelings connected with the *humming* of the bee, than the fact that it is mentioned by so many of our British poets—introduced amid their finest productions, and connected with the beauty and the exuberance of summer.

"Hark! the bee winds her small, but mellow horn,
Blithe to salute the sunny smile of morn;"

is the description given by Rogers.

"The sycamore, all musical with bees,"

is the harmonious line of Coleridge. It is introduced as a simile in Hogg's "Pilgrims of the Sun:"—

——"As they pass'd by
The angels paused, and saiuts that lay reposed
In bowers of Paradise, upraised their heads
To list the passing music, for it went
Swift as the wild bee's note, that on the wing
Booms like unbodied voice along the gale."

In the sweet and artless poem, by Wilson, of "Bessie Bell and Mary Gray," it is thus noticed:—

"And from the hidden flowers, a song
Of bees in a happy multitude,
All busy in that solitude."

Milton, in his "Penseroso," has connected the hum of the bee with the murmuring of the waters:—

Hide me from day's garish eye,
While the bee with honied thigh,
That at her flowery work doth sing,
And the waters murmuring,
With such concert as they keep,
Entice the dewy-feather'd sleep."

In the enumeration of the "melodies of morn," in Beattie's "Minstrel," the picturesque image of

"The wild brook babbling down the mountain side,"

does not impart greater pleasure to the mind, than the more humble objects in another line,—

"The hum of bees, the linnet's lay of love."

In one of Byron's stanzas, in which the poet has grouped together a collection of pleasing objects and of simple sounds, which neither in beauty nor variety

have ever been surpassed, he thus concludes the verse :—

> —"Sweet the hum[1]
> Of bees, the voice of girls, the song of birds,
> The lisp of children, and their earliest words."

Shakspeare's knowledge of bees does not seem to have been limited to the three kinds which constitute the "buzzing pleased multitude" found in our bee-hives; he has noticed those which are solitary in their habits, as well as those which are social. Thus we find in "All's Well that Ends Well," "red-tailed humble-bee," a kind which nidificates among heaps of stones. The humble-bee is introduced on another occasion, when Bottom, in the "Midsummer Night's Dream," is giving orders to his fairy attendants. The playful and sportive fancy which reigns in these commands is inimitable; and the diminutive stature of Cobweb is well indicated by the fear that he should be "overflown with a honey bag." Hazlitt was so well pleased with the passage, that in his "Characters of Shakspeare's Plays," he quotes the commencement of it, and remarks, with a note of admiration, "What an exact knowledge of Natural History is here shown;" although every boy who has spent his summer holidays in the country, is well acquainted with the "bag o' the bee." This bag is, in fact, the first stomach of the insect. Into

it the liquid honey which is collected by the tongue flows, after passing through the mouth and œsophagus. It is a membranous receptacle, capable of considerable distension, and exhibiting a different aspect, according to the quantity it contains of that saccharine fluid, which is there converted into honey.

Next to "the bag o' the bee," I may naturally notice the products derived from the labours of the same insect. These are principally wax and honey; both of which are mentioned by Shakspeare. The former is brought forward as being the material employed for the sealing, not of letters only, but of bonds and other legal instruments. Thus Cade, after having declared that he will "make it felony to drink small beer," and announced his intentions relative to other legislative enactments of a corresponding character, proceeds in a strain admirably illustrative of the man: —

"Is not this a lamentable thing, that the skin of an innocent lamb should be made of parchment, and that parchment being scribbled o'er, should undo a man. Some say the bee stings; but I say 'tis the bee's wax: for I did but seal once to a thing, and I was never my own man since."—*Second Part Henry VI.*, Act IV. Sc. II.

When Edgar has overcome the steward of Goneril, he takes from his pockets the letters confided to his charge; and as he breaks the seal, he justifies to himself the act he is committing: —

"Leave, gentle wax, and manners, blame us not;
To know our enemies' minds, we'd rip their hearts;
Their papers are more lawful."—*Lear*, Act IV. Sc. VI.

t is again mentioned, when Imogen, the fond and aithful Imogen, receives a letter from her lord Leo-natus; her words are—

"Good wax, thy leave,—blest be
Yon bees, that make these locks of counsel! Lovers
And men in dangerous bonds pray not alike;
Though forfeiters you cast in prison yet,
You clasp young Cupid's tables."
Cymbeline, Act III. Sc. II.

You are of course aware, that the sealing-wax we now employ consists of lac and resin, combined with some suitable pigment for giving it the desired colour. This lac is itself an insect product, being secreted by a species of coccus common in the East Indies. No portion of bees'-wax enters into the composition of the material now used for sealing letters; but that it may at a former period have been so used, I will not presume to deny. At present, it forms the principal ingredient of the soft and colourless wax attached to letters patent under the Great Seal, or to charters of corporations, and public documents of a similar character; but "the lover, sighing like furnace," never confides his sorrows to the custody of the bee's wax.

The researches of modern times have ascertained

a remarkable fact relative to the formation of this substance, namely, that it is secreted by bees different from those which attend to the feeding of the young; or, in other words, the working bees, which were formerly supposed to be all alike, may be divided into two classes,—wax-workers and nurses.

For our knowledge on this subject, we are principally indebted to the observations of a blind man, the elder Huber, who made the study of bees the occupation and solace of many years of visual darkness. This he was enabled to do by the untiring attention of his wife, who faithfully recounted the phenomena which glass hives, variously constructed, enabled her to witness. He saw by means of her eyes, and in his experiments, he was assisted by a patient investigator, M. Burnens. From Huber we learn that wax is not collected from flowers, as was formerly supposed, but is secreted by the wax-workers by means of peculiar organs, which may easily be seen, by pressing the abdomen so as to cause its distension. It is not, however, a secretion that is constantly going on; it is one which takes place only when wax is required for the construction of the comb. To supply it, the wax-workers are obliged to feed on honey, and to remain inactive, generally suspended from the top of the hive, for about twenty-four hours previous to the deposition of the wax.

What we read, therefore, of the bee collecting wax and carrying it to the hive, is fabulous. The error originated in the pollen with which bees are so frequently laden, and which forms the bee bread of the community, being mistaken for two little pellets of wax, which the industrious insect was supposed to have gathered. Shakspeare, as might be expected, has adopted the universal, though incorrect, opinion of his day. In the line, therefore,

"Our thighs are pack'd with wax"—

we recognize one of those instances, where the knowledge of the present time can be contrasted advantageously with that of the past.

The word "honey" is of frequent occurrence. When, in the English camp at Agincourt, King Henry the Fifth, after the just and profound reflection —

"There is some soul of goodness in things evil,
Would men observingly distil it out;"—

illustrates his meaning still further, by the observation—

"Thus we may gather honey from the weed."
Act IV. Sc. I.

When Friar Lawrence is waiting in his cell, for the arrival of Juliet, and is endeavouring to control the

transport of the expecting Romeo, he well remarks,—

"These violent delights have violent ends;"

and adds —

—— "the sweetest honey
Is loathsome in his own deliciousness,
And in the taste confounds the appetite;
Therefore, love moderately."—*Act II. Sc. V.*

But in general, the word is used metaphorically, not literally. Thus Norfolk, in speaking of Cardinal Wolsey, says, —

—— "the king hath found
Matter against him, that for ever mars
The honey of his language."
Henry VIII., Act III. Sc. II.

And in the scene where Ophelia has borne the strange and ungentle language of Hamlet, "get thee to a nunnery," after her first thought, with all a woman's fondness, has been given to his mental aberration: —

"O! what a noble mind is here o'erthrown;"

she deplores her own condition, in the words,—

"And I of ladies most abject and wretched,
That suck'd the honey of his music vows."
Act III. Sc. II.

In the same manner the word is employed by Romeo, on his descent into the monument where lies the "living corse" of the "fair Juliet."

—— "O my love! my wife!
Death, that hath suck'd the honey of thy breath,
Hath had no power yet upon thy beauty."—*Act V. Sc. III.*

Not content with using the word both in a literal and in a metaphorical sense, the Poet has interwoven it into several endearing epithets, as "honey love;" "honey nurse," &c.; and in "Julius Cæsar," the still more euphonious expression,—

"Enjoy the honey-heavy dew of slumber."—*Act II. Sc. I.*

The admirable symmetry and regularity of the combs have, no doubt, attracted your attention; but perhaps you are not aware, that their form is almost that which a mathematician would select to combine the greatest extent of accommodation and greatest strength, with the smallest expenditure of material. The cells are arranged so close together, and in a manner so skilful, that no space is lost between them. The knowledge of the fact, that there are no vacant spaces between the cells, gives increased effect to the words of Prospero, when he replies to the imprecations of Caliban: —

—— "Thou shalt be pinch'd
As thick as honey-combs: each pinch more stinging
Than bees that made 'em."

Tempest, Act I. Sc. II.

This passage refers to a fact in the economy of bees, which I have not yet noticed: I mean their power of stinging. Of this fact, almost every one has,

at some time or other, had painful experience. Shakspeare says —

> "Full merrily the humble bee doth sing,
> Till she hath lost her honey and her sting;"—
> (*Troilus and Cressida*, Act V. Sc. XI.)

a couplet which leads us to infer that the Poet was well aware of these insects losing their sting, by being unable to retract it from the wound they have inflicted.

In the sarcasms to which Brutus and Cassius give utterance against Antony, the same topic is thus introduced:—

> "*Cas.*—The posture of your blows are yet unknown;
> But for your words, they rob the Hybla bees,
> And leave them honeyless.
> *Ant.*—Not stingless too—
> *Bru.*—O yes, and soundless too;
> For you have stol'n their buzzing, Antony,
> And very wisely threat before you sting."
> *Julius Cæsar*, Act V. Sc. I.

From the numerous passages in which the bee is introduced, we might almost be warranted in supposing that this insect was a favourite with Shakspeare. It has certainly furnished him with numerous similes, and what is rather remarkable in a writer possessed of such varied powers of illustration, he has caused it to be twice mentioned by King Henry the Fourth, in the course of one scene,—first, when meditating on the wild and riotous life pursued

by the Prince; and secondly, when he supposes that the anxiety felt by his son for the crown had caused its removal from his pillow. The first of these passages has been already noticed; the second, I shall now quote: —

"How quickly nature falls into revolt,
When gold becomes her object.
For this, the foolish over-careful fathers
Have broke their sleeps with thought, their brains with care,
When, like the bee, tolling from every flower
The virtuous sweets,
Our thighs are pack'd with wax, our mouths with honey:
We bring it to the hive; and, like the bees,
Are murder'd for our pains."
Second Part Henry VI., Act IV. Sc. IV.

The mode in which this murder is committed, is indicated by Shakspeare in another passage. Talbot is giving vent to his surprise and vexation at the English troops being repulsed by Joan of Arc: —

"As bees with smoke, and doves with noisome stench,
Are from their hives and houses driven away."
First Part Henry VI., Act I. Sc. V.

In Thomson's "Autumn," we have a detailed account of the process. The hive has been "at evening snatched," and "placed o'er sulphur."

"Sudden the dark oppressive steam ascends,
And, used to milder scents, the tender race
By thousands tumble from their honied domes,
Convolved and agonizing in the dust."

It is much to be regretted, that when we could so

easily obtain the honey of the hive-bees without destroying these industrious insects, the practice of putting them to death should still be continued. It is both cruel to the bees and injurious to the honey. The practice may easily be avoided; for a very simple contrivance is sufficient for the purpose. Some hives, which I have seen in the garden of a friend, had a few inches taken horizontally off their summit; over this aperture, a board was fitted, with holes for the passage of the bees, and a tin slide to close these holes when necessary. Above this, a small hive was placed: this, which could be removed at pleasure, was filled by the bees with honey of the finest kind, and the lower hive contained their winter store, and their youthful progeny.

Boxes of various kinds, for the same humane object, have been invented, and are described in various works. The neatest I have seen are those belonging to my friend, Thomas Jackson, Esq., of this town, one of the architects under whose superintendence our Museum was erected. A small room in the back part of his dwelling-house was appropriated to his bees, who entered the boxes prepared for their reception by a covered passage, communicating with the external air by means of an aperture cut in a pane of glass for their reception. Outside of the window was a board, on which they alighted

prior to their entrance, and which thus corresponded to "the suburb of their straw-built citadel," in the ordinary hive. As far as the eye could reach, nothing but the roofs of small houses could be seen, except where the vision was bounded and closed in by the walls of other edifices of a more lofty structure. It seemed wonderful how, amid such a multitude of houses, the bees could find their way back to the one from which they issued. The theory propounded by Rogers, in his "Pleasures of Memory," that it is by retracing

"The varied scents which charm'd them as they flew,"

would certainly be insufficient to explain the phenomenon. There was nothing wavering or uncertain in their homeward flight. In fact, from the moment they appeared in view, their course was in a direct line to their elevated abode, and so straight and rapid, that they resembled bodies projected by some powerful machine.

The gardens, meadows, and hedge-rows about town, no doubt, supply to these bees the materials for the prosecution of "their delicious task."

"Through the soft air the busy nations fly,
Cling to the bud, and with inserted tube
Suck its pure essence, its ethereal soul."

THOMSON'*s Spring.*

The beach along the shores of our bay renders, perhaps, some assistance, by the salt which it affords; for I have often seen bees on the margin of the sea, and understand, that they thrive well along the entire of the northern coast, from Belfast to the Causeway. The Cavehill, however, a mountain, which, at a distance of about three miles from town, rises to the height of 1100 feet, holds out, on its heathery and uncultivated sides, richer attractions:—

> "And oft, with bolder wing, they soaring dare
> The purple heath, or where the wild thyme grows,
> And yellow load them with the luscious spoil."
>
> THOMSON'*s Spring.*

A glass bell, placed upon the top of the bee-box, or glass hive, for I know not which is the more proper term, is soon filled with honey. The comb is remarkable for its whiteness and transparency, and the honey seems to be of the finest and purest kind. Mr. Jackson's father has several glass hives of a similar construction, at Waterford; and has, on different occasions, obtained two shillings and sixpence a pound for a glass bell and its contained honey. One bell produced, at this price, three pounds seventeen shillings and six pence; and two others about three pounds thirteen shillings each, having been purchased by a druggist in Bristol, as a substitute for the celebrated honey of Narbonne.

It is curious how places have become famed for one production, and continue to be so, while the generations of man pass away; nay, while the very laws and institutions of the country have been overthrown. A feeble plant may thus, in its descendants, survive the "wreck of empires," for Nature is ever fresh, vigorous, and unchanged, while human monuments crumble into dust. While Greece, at the present time,

"Is Greece, but living Greece no more;"

the honey of Hymettus retains all its former celebrity. Athens is no longer the abode of arts, eloquence, literature, or science,—but

—— "still his honied wealth Hymettus yields;
There the blythe bee his fragrant fortress builds;
The free-born wanderer of the mountain air."
Childe Harold, Canto II. St. 87.

Washington Irving, in his "Tour on the Prairies," has given a very animated description of a bee-hunt in one of the great American forests, and states, in the following words, a remarkable opinion, which is held concerning the wild bees:—"The Indians consider them the harbingers of the white man; and say, that in proportion as the bee advances, the Indians and the buffalo retire. We are always accustomed to associate the hum of the bee-hive with the

farm-house and the flower-garden, and to consider those industrious little animals as connected with the busy haunts of man; and I am told that the wild bee is seldom to be met with at any great distance from the frontier."* In the observations respecting the bee-hive we can all perfectly concur, although written in a country differing in so many particulars from our own, and where new forms of vegetation replace the heaths and roses, among which the bees of these kingdoms delight to revel.

Though the flight of the bee is at all times pleasing, it is especially so when, at the close of a summer day, she directs her course homeward to the hive or to the nest. At that hour, when the freshness of evening is in the air, and the hues of sun-set in the sky, there are many who have, with the poet,

> "Welcomed the wild bee home on wearied wing.
> Laden with sweets, the choicest of the spring."
> ROGERS' *Pleasures of Memory*, Canto I.

To all such the maiden's song, when "busy day is o'er," will be fraught with peculiar charms.

> "Hark! along the humming air
> Home the laden bees repair."
> MILMAN's *Martyr of Antioch*.

I must not, however, conclude the subject of Bees, without mentioning a curious fact, communicated to

* Miscellanies, by the Author of the Sketch-Book, p. 61.

me by Mr. Jackson. He brought over three hives from Bristol to Waterford, in the summer of 1828. Next spring, a full month before any of the inhabitants of the Irish hives in the same garden were stirring, the English bees were busily at work, and by the time their neighbours had commenced, had formed a considerable quantity of comb. Next year, they were earlier than the Irish bees, but not so much so as the preceding season; and they have now, like some other settlers, adopted the seasons and customs of those among whom they have taken up their abode. It would be interesting, in connexion with this fact, to ascertain the time at which certain flowers come into blossom at Bristol and at Waterford.

Another insect, no less known than the bee, but regarded with very different feelings, is the Wasp. The two insects, besides a general resemblance in form, have a considerable similarity in some of their habits. Both live in numerous communities,—both construct hexagonal cells, in which their young are reared; and both labour with untiring perseverance for their support. The wasps, however, do not store up food, nor do they collect honey. They are armed freebooters, and take by force what they will not stoop to acquire by toil:—

—— "the good old rule
Sufficeth them; the simple plan,
That they should take who have the power,
And they should keep who can."—*Wordsworth.*

To such lengths do they carry their contempt of the law of the realm, that even the fear of incurring the pains and penalties of a violation of the Excise laws does not prevent them from practising openly as unlicensed paper-makers. Nay, my dear friend, look not incredulous;

"Remember, I have done thee worthy service;
Told thee no lies; made no mistakings;"
(*Tempest*, Act I. Sc. II.)

and I repeat, that wasps are not only the most free, but also the most ancient, workers of this commodity in her Majesty's dominions. In fact, their nest is composed of paper, and of paper most ingeniously fabricated for the express purpose. With their strong mandibles they tear small splinters of wood from posts, railings, &c., in this neighbourhood, and they may at times be heard busy among the tall reeds on the banks of the Lagan, cutting off portions of the stems. The ligneous fibre thus obtained, forms the raw material. It is reduced by them to a pulp, and spread out, not so expeditiously, but quite as effectually, as if our most improved machinery had been employed in the operation. The paper thus made is in this country of a greyish

colour, rough on the surface, and extremely thin, and retains those characteristics, whether it be under ground, or suspended to the branches of a tree. Our home manufacturer, if I may venture to use the expression, is greatly surpassed by that of some more tropical countries. I have at present in my cabinet a wasp's nest, from Berbice, in South America. It is about six inches in height, bell-shaped in its general form, and seventeen inches in circumference at its lower margin. A twig, to which it has been attached, passed through two apertures at the top; and a somewhat larger opening at the lowest part, formed the entrance to the interior of the nest, protected from rain by the manner in which it projected beyond the adjacent parts. In this specimen,

Wasps' Nest.

the rough surface and loose flakes of the tree-nests of this country have disappeared, and in their place

is a firm, compact, and perfectly white surface, as smooth and polished as the finest pasteboard. The accompanying figures represent a nest of a species of wasp, which was found in Oxfordshire, and forwarded to Mr. Westwood.

But though an Entomologist may take pleasure in observing the labours of wasps, both in constructing their nests and in rearing their young, and look with satisfaction on the ceaseless exertions by which the food necessary for the support of the grubs is procured, he will find few persons who entertain similar ideas; on the contrary, he will observe, that they are universally regarded as bold, audacious, and dangerous intruders. They alight fearlessly on the viands in our parlours; they rifle the choicest fruit in our gardens; and are prompt to avenge with their sting the slightest molestation.

There is, perhaps, scarcely any person who has not suffered from the wound which this formidable weapon inflicts, by inadvertently provoking the irritable insect by which it is borne. In fact, so easily is its wrathful temperament aroused, that extreme irritability or irascibility can scarcely be expressed by a stronger term than "waspish." It is, accordingly, in this sense, that we find Shakspeare has applied the epithet, "her waspish-headed son," when we are told in the "Tempest," that Cupid is

resolved to "be a boy outright;" and again, in "As You Like It,"—

> "I know not the contents; but, as I guess
> By the stern brow and *waspish* action
> Which she did use as she was writing it,
> It bears an angry tenour."—*Act IV. Sc. III.*

In the celebrated scene in which the reconciliation between Brutus and Cassius is effected, the word is used in a similar manner:—

> "I 'll use you for my mirth; yea, for my laughter,
> When you are waspish."—*Act IV. Sc. III.*

In the first interview between Catherine and Petruchio, the word has precisely a similar signification. In accordance with his resolution to "woo her with some spirit when she comes," Petruchio, ere long, addresses his intended spouse by an epithet not usually found in a lover's vocabulary —

> "*Pet.*—Come, come, you *wasp*, i' faith—you are too angry.
> *Kath.*—If I be *waspish*, best beware my sting.
> *Pet.*—My remedy is then to pluck it out.
> *Kath.*—Ay, if the fool could find it where it lies.
> *Pet.*—Who knows not where a wasp doth wear his sting?
> In his tail."—*Taming of the Shrew*, Act II. Sc. I.

Its power of stinging, and its proneness to exert that power, are the reasons why the word "wasp" is applied to individuals who would be apt to avenge real or imaginary injuries. This may be exemplified by the line,

"Let not this wasp outlive us both to sting."
Titus Andronicus, Act II. Sc. III.

Those characteristics are again referred to, when Suffolk, in "Henry VIII." is replying to the question—

—"will the king
Digest this letter of the Cardinal's?
Suffolk.—There be more wasps that buz about his nose,
Will make this sting the sooner."—*Act III. Sc. II.*

I have already mentioned, that the wasps do not, like the bees, collect and store up honey: there is nothing, however, of which they are more fond; and they scruple not to arrest it by force from the industrious inhabitants of the hive. In this attempt, they "let no compunctious visitings o' nature shake their fell purpose;" and not unfrequently put to death the victims of their rapacity. This fact has not escaped the eye of Shakspeare. His knowledge of it furnishes a metaphor employed, in the "Two Gentlemen of Verona," by Julia, to express her contrition for having torn the letter of "the love-wounded Protheus:"—

"Oh! hateful hands, to tear such loving words;
Injurious wasps, to feed on such sweet honey,
And kill the bees that yield it with your stings!"
Act I. Sc. II.

An allusion to the fondness of the wasps for honey is, in the "Winter's Tale," put with ludicrous effect into the mouth of Autolycus. The "rogue," so let

me call him, though he says he is "proof against that title," has terrified the old shepherd by a description of the tortures he shall feel, summed up by the words, "All deaths are too few; the sharpest, too easy." The younger rustic, alarmed on his own account, by the apprehension of similar sufferings, timidly inquires,—"Has the old man e'er a son, sir; do you hear, an't like you, sir?" and is utterly horrified by the reply:—"He has a son, who shall be flayed alive, then 'nointed over with honey, set on the head of a wasps' nest, then stand till he be three-quarters and a dram dead: then recovered again with aquavitæ, or some other hot infusion: then, raw as he is, and in the hottest day, prognostication proclaims shall he be set against a brick-wall, the sun looking with a southward eye upon him; where he is to behold him with flies blown to death." "But what talk we of those traitorly rascals," adds Autolycus; then, changing the subject, inquires their business with the King, and proposes, on being "gently considered," to "whisper him on their behalfs." The clown, delighted at the intercession of one who "seems to be of great authority," bids his son "close with him; give him gold." The whole scene is replete with comic humour; and if the stinging of the wasps has been too long dwelt on—if my prolixity has tempted you to exclaim,—"Friend, you

are tedious," let the mode in which the fact is introduced by Autolycus make you amends.

Shakspeare has noticed another insect, which, although very different from those we have now been considering, belongs, like them, to the order Hymenoptera. Perhaps this may seem to you a strange arrangement, and you may wonder that the busy little wingless creatures, whose habitations you have now and then inadvertently disturbed or wilfully invaded, should be classed with those insects which are furnished with four conspicuous wings. But if you have ever examined the interior of an ant's nest in the month of August, you may perhaps have noticed that some of the inmates appear of larger dimensions than usual, and that they are adorned with four wings, similar to those of a wasp, or bee. These are the female ants, just after their liberation from the cocoon. They soon desert the place of their nativity; and, borne on their extended wings, seek for new localities in which to establish their industrious colonies. As soon as their new abode has been selected, the object for which the wings were given is accomplished. These now useless appendages are laid aside, not metaphorically, but literally. They are actually thrown off by the exertions of the insect herself, who now sedulously commences to lay the foundations of her populous kingdom.*

* See Kirby and Spence, vol. i. p. 370.

Few insects are more widely diffused than the ant. Its habits have attracted universal notice; and it has been celebrated, both by sacred and profane writers, as a model of prudence, foresight, wisdom, and diligence. In Proverbs we are told (chap. xxx. ver. 24), "There be four things which are little upon the earth; but they are exceeding wise;" and in the enumeration which follows, the ants are placed first, and are described as "a people not strong, yet they prepare their meat in the summer." In another part, (chap. vi. ver. 6), Solomon desires the sluggard to "go to the ant, consider her ways, and be wise; which having no guide, overseer, or ruler, provideth her meat in the summer, and gathereth her food in the harvest." Many of our British poets have applauded the foresight of the ant; and have either described her as storing up grain for winter use, or have alluded to such a circumstance. She is thus characterized by Milton:—

—— "First crept
The parsimonious emmet, provident
Of future, in small room large heart enclosed."

Parnell depicts her as

"Pressed by the cumbrous weight of single grains;"

these grains being "the burdens of a wintry store." A similar idea was probably entertained by Rogers, when he penned the harmonious couplet,—

"How oft, when purple evening tinged the west,
We watch'd the emmet to her grainy nest."

But it is unnecessary to multiply quotations to show, that among all our popular writers, as well as among our agricultural population, who might be supposed to have the best means of observing the habits of the ant, she is universally represented as storing up food, and providing for the wants of winter. Yet, universally as this opinion has prevailed, it is not the less erroneous, and no species of ant has yet been discovered, which thus hoards up grain. The mistake seems to have had its origin in observing the ants carrying their young in the state of pupæ, which in size and shape somewhat resemble a grain of corn; and this opinion would be strengthened by seeing the ant occasionally gnawing the end of one of these little oblong bodies, as if to extract the substance of the grain, but, in reality, to liberate the enclosed insect from its confinement. Shakspeare, in his notice of this insect, has shown his usual accuracy of observation, when he says,—"We 'll set thee to school to an ant, to teach thee there is no labouring in the winter;" for the ants in these countries lie dormant during that season, and consequently do not require food for their support. It is possible that in warmer climates we may yet discover some species which do not pass the winter in a dormant state, and which, of course, would require a supply of food. But, so far as our acquaintance with

their modes of life at present extends, no species of ant whatever hoards up grain. When Solomon, therefore, describes the ant "as providing her meat in the summer," he intimates, that she employs industry in taking advantage of the season proper to accomplish a specific purpose; and in this respect, we may all "consider her ways and be wise."

The appearance of a plain, on which numerous colonies of ants have reared their mansions, has been beautifully described by Wordsworth :—

> ——— "The intelligence that makes
> The tiny creatures strong by social league
> Supports the generations, multiplies
> Their tribes, till we behold a spacious plain
> Or grassy bottom, all with little hills,
> Their labour, cover'd as a lake with waves;
> Thousands of cities in the desert place,
> Built up of life, and food, and means of life!"
>
> *The Excursion.*

It is somewhat remarkable, that an insect so well known, should, throughout all the dramatic works of Shakspeare, be but once mentioned; when others, not more attractive, are so frequently introduced. Perhaps, as the industry of the ant is the quality for which it is conspicuous, it did not admit of the variety of simile, or of the light and fanciful analogies essential for the purposes of the poet. Instead, however, of indulging in what can only be regarded as conjectural, I shall for a moment forsake the writings

of "my very noble and approved good master," to mention a circumstance which can easily be verified by your own observation.

The first time it attracted my attention, was on a fine day in the month of September, 1829. I was then visiting the beautiful demesne of Lord Annesley, at Castle-wellan, and noticed a holly tree, on which a number of wasps were continually alighting, running rapidly over its leaves, and flitting from branch to branch. A number of holly trees were scattered over the lawn; but not one exhibited the same exhilarating bustle. I sat down beside it, to endeavour to ascertain what peculiar attraction this tree possessed, and soon found that the wasps were not its only visitors. A number of ants were plodding quietly along the twigs and leaves, exhibiting, by their staid and regular deportment, a singular contrast to the rapid and vacillating movements of the wasps. I now discovered, that both ants and wasps were attracted by a substance which was plentifully sprinkled over all the leaves,—the celebrated honey-dew of the poets. This substance has furnished Shakspeare with a touching and pathetic simile, which he has put into the mouth of Titus Andronicus—

> "When I did name her brother, then fresh tears
> Stood on her cheeks; as doth the honey-dew
> Upon a gather'd lily almost wither'd."—*Act III. Sc. I.*

Honey-dew, instead of being, as Pliny conjectures, the saliva of the stars, or a liquid produced by the purgation of the air, is a secretion deposited by a small insect, which is green upon the rose-tree and black upon the wood-bine, and which Entomologists distinguish by the generic name of Aphis. The liquid they deposit is perfectly pure, and rivals either sugar or honey in its sweetness. The ants not only suck it up with eagerness, whenever it can be found, but they possess the art of making the aphides yield it, by patting them gently with their antennæ; and one particular species of ant is said to confine the aphides in apartments constructed solely for that purpose, to supply them with food, to protect them from danger, and to take, in every respect, as much care of them as we should do of our milch cattle.

This may seem wonderful, nay, perhaps incredible. But, for a full confirmation of its accuracy, and for a delightful exposition of other facts not less surprising, I refer you to M. P. Huber's work on Ants, and conclude my present lengthened epistle in the words of that accurate observer:—"The more the wonders of nature have attractions for me, the less do I feel inclined to alter them by a mixture of the reveries of imagination."

It is probable this letter will scarcely have been closed, until I shall remember some circumstance

which I would not willingly have omitted. Such, at least, has been the case in my former letters, even with respect to passages penned by Shakspeare himself. Thus, in speaking of beetles, a line was overlooked, with which I have been familiar, "even from my boyish days," and which gives a most forcible idea of the dizzy altitude of Dover cliff:—

> "The crows and choughs that wing the midway air,
> Show scarce so gross as beetles."—*Lear*, Act IV. Sc. VI.

Should you take the trouble of directing my notice to similar omissions, I shall heartily rejoice, as it will afford the best proof of your interest being now awakened.

"O' my word, the father's son: I'll swear 'tis a very pretty boy. O' my troth, I looked upon him o' Wednesday half an hour together."—"I saw him run after a gilded butterfly."

CORIOLANUS, ACT I. SC. III.

THE individuals I have now to bring before you, are the most admired of all the insect tribes. In expanse of wing, and beauty of colouring, they stand unrivalled. Some are scarcely distinguishable from the leaves of plants or the trunks of trees on which they repose; others are of the most unsullied white,

"Pure as the snow-flake ere it falls to earth."

Some exhibit gorgeous metallic hues; and others display an azure equal in its intensity to that of the

summer sky at noon. Nor are the markings of their wings and bodies less varied, or less attractive. Lines, dots, circles, triangles, parallelograms, may there be noticed, mingled in endless variety, and showing, that even in her most playful freaks, the colouring of nature is at all times beautiful. But the butterfly has to us a charm superior to all its external claims to admiration. It is among insects, what the primrose is among flowers—the prize of our childhood, and the object of our boyish exertion. What "young hunter of the butterfly and bee" does not recollect how eagerly it was pursued, the fear of wet feet or of soiled clothes, and all the cautions of mamma, totally forgotten? A tumble over some concealed drain is disregarded; the object of pursuit is neared,—it is struck down on the grass,—the rim of the hat is slowly raised,—and oh! how proud is the little urchin to find his captive safe and unharmed within! But alas! such delights are transitory. The prisoner, by one vigorous dart, may regain his freedom; or, if retained in durance, soon loses a portion of his beauty. The wings, touched by the fingers, part with some of their colouring, and justify the propriety of Shakspeare's epithet of "mealy." If, however, this "mealy" substance be examined under a lens, it will be found not to consist of fine dust, but of minute scales, preserving a regular

and peculiar form, and differing in the different families. It is from the circumstance of the wings being thus covered with scales, that the term Lepidoptera has been employed, to express the distinguishing characteristic of the order to which the different kinds of butterflies, sphinxes, and moths belong.

Such are the insects which are to "furnish forth," I hope not "coldly," the materials for the present "banquet:" and, as among these the butterflies are generally viewed as the most important, I shall commence with them; adding occasionally, to use the language of Justice Shallow, "any pretty little tiny kickshaws."

I may first, however, remark that the lepidopterous insects are universally diffused. In the flower-garden, they flit from blossom to blossom; in the pastures, they rise almost from under your feet; on the mountain, they dart forth as you rustle through the heather; in the forest, they attract your notice, glancing through its bright and sunny glades, or motionless as the lichens which variegate the trunks of its leafy monarchs. Not content with the possession of ubiquity out of doors, they enter into our dwellings, and are found even in the recesses of our chambers. They are fitted, not only for every place, but for every season. Some appear with the violets of spring, some with the roses of summer, some with the dahlias of autumn, and

one, at least, with the chrysanthemums of winter. It is strange, that beings so fragile should be found at a season so inclement; but HE who has constructed the snowdrop, so as to bear, uninjured, the drifting storms of February, has enabled a small, darkish-coloured moth to endure the rigour of December,

> "When milk comes frozen home in pail."
> *Love's Labour Lost*, Act V. Sc. II.

This little visitant is not difficult to find. In successive years, I have observed it in the sheltered

Larva, Pupa, and Imago of Hipparchia pamphilus.

walks of our botanic garden; and the name by which it is distinguished, the December moth (*Eriogaster populi*), marks well the season of its appearance.

As all butterflies appear by day, and as they are objects equally beautiful and conspicuous, it may be expected that they are not unfrequently introduced

into poetic compositions. Long ere the Italian poet had dared to designate the insect as "l' angelica farfalla," the ancients had found in its transformations a symbol of the vague and shadowy ideas they entertained of the life of man here, of his repose in the tomb, and of the probability of a more glorious state of being hereafter. The Egyptian fable, as it is supposed to be, of "Cupid and Psyche," seems built upon this foundation. "Psyche," says an ingenious and learned writer, "means in Greek, the human soul; and it means also, a butterfly; of which apparently strange double sense, the undoubted reason is, that a butterfly was a very ancient symbol of the soul. From the prevalence of this symbol, and the consequent coincidence of the names, it happened that the Greek sculptors frequently represented Psyche as subject to Cupid, in the shape of a butterfly; and that even when she appears in their works under the human form, we find her decorated with the light and filmy wings of that gay insect."*

The existence of the butterfly is so associated with pleasing ideas, and apparently so removed from aught that is irksome, that in Thomson's "Castle of Indolence," we find the Wizard, in the very first verse of his "syren melody," brings forward the condition of this insect, as contrasted with that of man:—

* Nare's Essays, i. 101, quoted by Kirby and Spence, iv. 74.

"Behold! ye pilgrims of this earth, behold!
See all, but man, with unearn'd pleasure gay:
See her bright robes the butterfly unfold,
Broke from her wintry tomb in prime of May!
What youthful bride can equal her array?
Who can, with her, for easy pleasure vie?
From mead to mead with gentle wing to stray,
From flower to flower on balmy gales to fly,
Is all she hath to do beneath the radiant sky."

Stanza IX.

Wordsworth hath noticed the butterfly in a manner to which the feelings of every naturalist will respond:

—— "The mute insect, fix'd upon the plant
On whose soft leaves it hangs, and from whose cup
Drains imperceptibly its nourishment,
Endear'd my wanderings." *The Excursion.*

He has again depicted the same insect when she springs from her place of momentary rest, and wings her wandering and changeful flight high in the summer air:—

—— "Before your sight,
Mounts on the breeze the butterfly, and soars,
Small creature as she is, from earth's bright flowers
Into the dewy clouds." *Idem.*

The flight is so variable, so inconstant, so far beyond any laws which we can lay down for its guidance or its object, that Mrs. Hemans has likened the butterfly to

"an embodied breeze at play."

In Lord Byron's "Giaour," a highly popular passage on this subject is to be found; one where, however,

we dissent from the conclusion, as forcibly as we admire the description. The beginning is the only part I have occasion to quote :—

> "As, rising on its purple wing,
> The insect-queen of Eastern spring,
> O'er emerald meadows of Kashmeer
> Invites the young pursuer near,
> And leads him on, from flower to flower,
> A weary chase, and wasted hour."

Moore has introduced these insects amid the splendour of "The Light of the Haram :"—

> "And they, before whose sleepy eyes,
> In their own bright Kathain bowers,
> Sparkle such rainbow butterflies ;
> That they might fancy the rich flowers
> That round them in the sun lay sighing,
> Had been by magic all set flying !"

The flight of the butterfly, thus beautifully described by the two most distinguished poets of the present day, has not been passed by Shakspeare unnoticed or unrecorded. When Valeria visits Virgilia during the absence of Coriolanus, she asks—"How does your little son?" and her question having been answered, she proceeds in the strain most likely to gratify his mother :—"O' my word, the father's son ; I'll swear 'tis a very pretty boy. O' my troth, I looked upon him o' Wednesday half an hour together."—"I saw him run after a gilded butterfly ; and when he caught it, he let it go again ; and after it again, and

over and over he comes, and up again; catch'd it again: or whether his fall enraged him, or how 'twas, he did so set his teeth, and tear it. O! I warrant how he mammock'd it."—(*Act I. Sc. III.*)

The determination and absence of all fear which boys evince in the pursuit, has supplied a forcible simile at the time when Marcius, joined with the Volscians, is approaching Rome with the irresistible fury of a conqueror:—

> "He is their God: he leads them like a thing
> Made by some other deity than Nature,
> That shapes man better; and they follow him
> Against us brats, with no less confidence
> Than boys pursuing summer butterflies,
> Or butchers killing flies."—*Act IV. Sc. VI.*

The same species of butterfly may be more easily taken at one season of the year than at another. Thus, the yellow brimstone butterfly (*Gonepteryx Rhamni*), I have been told, is in spring vigorous in all its movements, and requires active exertion before it can be secured. In the autumn, it is so sluggish, that I have, on more than one occasion, lifted it between my finger and thumb. This insect has never been taken in the neighbourhood of Belfast. The late J. Templeton, Esq., was of opinion, that on one occasion he had seen it, but at such a distance, as to render him uncertain of the fact. On the 4th of July, 1829, I watched one for some time on

the quay of Belfast; but as a crowded wharf is a place but ill adapted for racing after butterflies, I had to allow the unusual visitant to escape, but not until I had been several times so near, as to preclude the possibility of any mistake as to the insect. I have taken it in the neighbourhood of Portarlington, in the Queen's County, where it is always considered extremely rare. In the Spirehill wood, near to the same town, I have met in great abundance one of the most beautiful native butterflies, the silver-streak (*Argynnis Paphia*). It appeared, in quantity, to be almost equal to the pretty little brimstone moth (*Rumia cratægata*), which flies in the dusk of evening under the hawthorn hedges. I have never seen any species of butterfly in the same profusion, not even the common white. Yet, in the immediate vicinity of Belfast, this insect is never seen. The only parts of the north of Ireland in which I am aware of its existence, are Tullamore Park, county Down, and Shane's Castle Park, county Antrim. An instance of the visual powers of this insect fell under my observation. Being in the Spirehill wood with two young friends, each armed with a butterfly net, the boys were enjoying, with great glee, the sport which the place afforded. One of them, in the excitement of the moment, made "one fell swoop" with the net at one of the Paphian butter-

flies. The steel rim of the net unfortunately struck the insect so forcibly as nearly to cut it in two, and render it useless as a specimen for the cabinet. The mutilated body was lying on the grass, and we were awaiting the further appearance of this "untaxed and unforbidden game," when an individual came in sight, flitted to the branch of a tree, and then darted in a straight line on the body of his deceased companion. He rested there but a moment, and then flew boldly away. The branch of the tree could not have been less than twelve or fourteen feet from the place where the dead butterfly lay. The other, to have acted as he did, must have had distinct vision at that distance. May I, my dear Arnold, while I communicate the circumstance, beg you will follow it up by further observation, and ascertain, if possible, at what distance insects of the different kinds seem capable of distinguishing objects.

There is a butterfly very similar to the one last mentioned, but the silver tints on the lower sides of its wings are arranged in spots, and not in streaks. It is called, therefore, the silver-spot butterfly (*Argynnis Aglaia*). This insect is not found at Portarlington, but has been observed by Mr. Hyndman at Briansford, with the preceding species. Two butterflies, which I have never seen on the wing, have been taken by the same gentleman: one the grayling

Hipparchia Semele), on the Knockagh, near Carrickergus, and on the strand at Portstewart; the other, he painted lady (*Cynthia Cardui*), near the town of Antrim, on one occasion only.

In speaking of the latter, Mr. Knapp remarks,—'This is a creature that visits us at very uncertain periods, and is vivified by causes infinitely beyond the comprehension of the Entomologist, seeming to require a succession and variety of seasons and their changes, and then springing into life we know not how." *

From what has been stated, it is obvious that the butterflies of different districts differ much from each other. The same holds good with respect to all the other insect tribes, and gives an additional stimulus to the exertions of the collector and the entomologist. It is, however, a very curious subject for observation and inquiry. The question continually recurs,—Why are they so local? Why, when we can detect no difference in the temperature or in the productions of two adjoining districts, are insects to be found in the one, which are never met with in the other? To this we can give no satisfactory reply. It is one of those things to which human knowledge has not yet attained. It is, perhaps, a mystery which we shall never be able to unfold. Who could

* Journal of a Naturalist, p. 290.

declare that the senses of insects are like to our senses, or their perceptions similar to those of man. May they not observe differences, nay, contrasts, where, to our eye, all seems uniformity? May they not,

> "Where full instinct is the unerring guide,"
> (*Essay on Man*, Epistle III.)

possess means of discrimination of which we can form no idea?

This part of the country cannot be considered rich in the variety of its Papilionidæ. Besides the white butterflies, which are common everywhere, we have several of different shades of brown (*Hipparchia Ægeria, Megæra, Janira, Hyperanthus*, and *Pamphilus*); nor do we want the beautiful little copper butterfly (*Lycæna Phlæas*). Of the blue, of which there are fifteen species in England, we have only one (*Polyommatus Dorylas*). Early in spring, the bright wings of the orange-tip butterflies (*Mancipium cardamines*) are to be seen flitting over the meadows, fresh and bright as the young flowers which bloom on every sunny bank, or the feathery catkins which the willow waves above the stream. Their appearance inspires "vernal delight and joy," and betokens the near approach of that warmer season, when

> "Ten thousand forms, ten thousand different tribes,
> People the blaze."
> THOMSON'S *Summer*.

During the summer, we have the tortoise-shell butterfly (*Vanessa urticæ*) unfolding his variegated

Tortoise-shell Butterfly, just emerged from the Chrysalis.

wings on every sunny ditch along the road-side. With the fruits of autumn, we have the admiral butterfly (*Vanessa Atalanta*), occasionally plentiful in September, and even enjoying the gleams of sunshine which give a waning lustre to October. But all these added together would scarcely amount to twenty different species—a number small indeed, compared with what some other parts of Britain afford.

One which is extremely common in England, is here totally wanting. I allude to that which exhibits in its decorations the splendid eyes which adorn the tail of the peacock, and whose velvet colouring is so

soft, so rich, and so resplendent, that the attendants of Titania, when ordered by their mistress, in her passion for "Bottom the weaver," to

> —— "pluck the wings from painted butterflies,
> To fan the moon-beams from his sleeping eyes,"—
> (*Midsummer Night's Dream*, Act III. Sc. I.)

could select none more gorgeous or more beautiful. The peacock butterfly (*Vanessa Io*), for so it is named, is found, though very rarely, in the neighbourhood of Portarlington; in the south of Ireland it is comparatively abundant, if I may judge from the numerous specimens which I have received from Cork.

Some of the species now mentioned are found in countries very remote from each other. Among a very small number of Papilionidæ, brought to me from Port Hope, in Upper Canada, *Phleas Aglaia* and *Atalanta* are found, and one almost, but not perfectly, identical with *Cardui*. And in a collection from "the frosty Caucasus," and now in the Museum of the Royal Institution of London, may be observed, I am told, *Io*, *Paphia*, *Cardui*, *Dorylas*, and *Atalanta*.

I shall not, at present, dwell longer on this attractive family, than merely to direct your attention to the manner in which the term "gilded butterflies" is applied by Shakspeare to gay, trifling, insignificant persons. The phrase occurs when Lear is about

being committed to confinement with Cordelia, towards whom he had previously confessed the injustice of his conduct. The old monarch, "fourscore and upwards," addresses his daughter in a manner at once so natural and so pathetic, that the passage can scarcely be read without emotion:—

—— "Come, let 's away to prison.
We two alone will sing like birds i' the cage:
When thou dost ask me blessing, I'll kneel down
And ask of thee forgiveness: So we'll live,
And pray, and sing, and tell old tales, and laugh
At gilded butterflies, and hear poor rogues
Talk of court news; and we'll talk with them too,
Who loses, and who wins; who 's in, who 's out;
And take upon us the mystery of things,
As if we were God's spies."

Lear, Act V. Sc. III.

The second great division of Lepidopterous insects is that comprising the Sphinxes. This name is applied in consequence of the attitude assumed by the caterpillar, the head being held erect, so as to give the figure, at a little distance, a resemblance to that of the Egyptian sphinx. Of course you will not find the term in Shakspeare, as it is one used only by Entomologists, as a convenient designation to denote a particular division of the objects of their research. Unlike the butterflies, the sphinxes do not in general delight in the bright and warm sunshine of noon; they prefer the cooler hours of the morning and evening. At such times, some species may be seen

darting along with great power and rapidity, or hovering over the flowers, from which they draw their nutriment. The flexible tube which they insert among the blossoms for this purpose, is sometimes of considerable length. In a specimen of *Sphinx convolvuli* taken at Londonderry, and brought to me alive by the guard of her Majesty's mail, it is nearly three inches long. When not in use, this "tongue," to use the popular name, is curled up like the corresponding organ in butterflies. The only sphinxes yet taken in this neighbourhood, are the following, and many of them are of rare occurrence :—*Anthrocera Filipendulæ*, the six-spotted burnet; *Smerinthus ocellatus*, the eyed hawk-moth; *Smerinthus populi*, the poplar hawk-moth; *Sphinx convolvuli*, the convolvulus hawk-moth; *Deilephila Elpenor*, the elephant hawk-moth; *Macroglossa stellatarum*, the humming-bird moth; *Sesia bombyliformis*, the narrow-bordered bee-moth; *Trochilium crabroniformis*, the lunar hornet.

I may add to this list the most remarkable of them all—the death's-head sphinx (*Acherontia Atropos*). It is also the largest, for its wings, when expanded, measure four inches and three-quarters across. The insect is named from the peculiar markings on its thorax; and as it possesses the power of uttering a shrill and plaintive cry, it has from these

two circumstances been regarded by the ignorant as an object of superstitious terror. By such, the "very

Death's-head Moth.

shining of its eyes is thought to represent the fiery element, whence it is supposed to have proceeded. Flying into their apartments in the evening, it at times extinguishes the light, foretelling war, pestilence, hunger, death, to man and beast." *

The caterpillar is of considerable size, and remarkable both in its form and colouring; yet I have never seen one alive, nor have I heard of its being observed in any of the potato fields in this vicinity. This may arise partly from their being few in number, and partly from their lying concealed in the day time, and feeding principally during the night.

The remaining insects of the order Lepidoptera are comprised under the general name of "Moth." This

* Journal of a Naturalist, p. 328.

term does not awaken many pleasing associations. In the minds of most people, it stands for an insect either contemptible from its size and inertness, or positively obnoxious from its attacks on many articles of clothing. The destructive power it exerts, is referred to by Pope, when contrasting the false with the true critics :—

> "Some on the leaves of ancient authors prey,
> Nor time, nor moths, e'er spoil'd so much as they."
> *Essay on Criticism*, Line 112.

Shakspeare employs the word "moth," to denote something trifling or extremely minute; and a doubt may be entertained, whether, in some passages, he intended any reference to the insect. Thus, in the touching appeal of Prince Arthur to Hubert,

> "*Arthur.*—Is there no remedy?
> *Hubert.*—None; but to lose your eyes.
> *Arthur.*—Oh Heaven! that there were but a *moth* in yours;
> A grain, a dust, a gnat, a wandering hair,
> Any annoyance in that precious sense!
> Then, feeling what small things are boist'rous there,
> Your vile intent must needs seem horrible."
> *King John*, Act IV. Sc. I.

In the same manner we have,

> "A *moth* will turn the balance."
> *Midsummer Night's Dream*, Act V. Sc. I.

And in "King Henry the Fifth,"—

> "Wash every *moth* out of his conscience."—*Act I. Sc. IV.*

You may, perhaps, then, not be prepared to learn;

that there are many moths not inferior in size or beauty even to the butterflies, though they cannot, like their diurnal brethren, boast of "troops of friends." There is one in my cabinet at present, bred from a caterpillar found in the lawn of the Royal Academical Institution, which measures nearly three inches and a half across the expanded wings. It is of a deep fawn colour, and is known by the name of the oak-moth (*Lasciocampa quercus*). The emperor (*Saturnia pavonia-minor*) is of equal dimensions, and from the splendour of his decorations well deserves his imperial title. It is one of the largest and most conspicuous species,— taken, although rarely, in this neighbourhood. A few others may also be mentioned, as the buff-tip (*Pygæra bucephala*), the ghost moth (*Hepialus humuli*), the great tiger moth (*Arctia caja*), the large sword-grass (*Calocampa exoleta*), and the great brown-bar moth (*Mormo maura*). The latter insect I have never seen alive; but know that it has been observed here by others. It was also seen about the Weir, at Portarlington, this autumn, alighting on the under surface of any projecting ledge on the stepping stones, and turning over while on the wing in a singular manner, so as to effect this object. I may add to these the puss moth (*Cerura vinula*), an insect, however, which is here of rare occurrence. Two chrysalids of an unusual appear-

ance were found at Carnmoney some years ago, and being put under the charge of Mr. Hyndman, produced in time a male and female of this species. An empty pupa case of the same insect was observed at Wolf-hill. These occurrences were sufficient to prove that the moth frequented this locality; but I never knew of one being actually taken on the wing until this summer, when a single specimen was sent to me alive from Hollywood, county Down. In the south of Ireland, on the contrary, the puss-moth must at times be extremely abundant; for in September, 1831, I was shown, at the Cove of Cork, some young poplar trees which had been nearly destroyed the preceding summer by the caterpillars of this insect. I procured, at the same place, a wicker basket, in which some of the larvæ had been confined, and where they had formed their cocoons by rasping off small portions of the woody fibre, and cementing it so strongly together, as not to be penetrated without difficulty, even by the blade of a pen-knife.

Perhaps, however, the moths may prove more attractive to you, "learned Theban," when they assume the garb of learning. Know, then, that there are two species which adopt not the costume of our universities, but two different Greek letters, as the "badge of all their tribe," and wear them very conspicuously emblazoned on their wings: one of

them is hence called Gamma, the other Iota. What other creatures could so appropriately claim such classic titles? I do not propose giving you a list of our moths, as I did of our butterflies and sphinxes. Their number precludes such an attempt. I know fully two hundred species taken in the neighbourhood of Belfast, and this is but a small portion of those which are probably to be found. Among them exists, as might be expected, considerable diversity with respect to their habitats: a very numerous tribe is found among our pasture fields, and its members are only driven from their lurking places by the passage of some object through the grass. This year, I noticed a very common little bird, one of the wagtails (*Motacilla alba*), adopt an ingenious plan for their capture. A cow was grazing, and of course passing slowly along, with her head close to the ground: the little bird placed itself so as to be almost in contact with her mouth, and hopped along as she advanced, seizing the moths which rose out of the grass at her approach. The cow paid no attention to the bird, and the bird seemed perfectly fearless with respect to the cow. Was there not reason as well as instinct in this procedure?

It is an unaccountable fact, that the night-flying insects, which shun the glare of the sunshine, and delight in darkness, should yet be so strongly

attracted by a light, as not only to hover around it, but even to fly into the flame. The practice is, however, so general, though so inexplicable, that when Portia says,

> "Thus hath the candle singed the moth,"
> (*Merchant of Venice*, Act II. Sc. IX.)

she uses an illustration with which every one is familiar, and mentions an action which the spectator cannot behold without his sympathy being disagreeably, if not painfully excited.

While sauntering "under the greenwood tree," you can scarcely have failed to observe, that the foliage presents, occasionally, a perforated or torn appearance; but, perhaps, you were not aware that the little beings by whom this was occasioned, were, in most instances, the caterpillars of moths. Their operations are not always carried on in so open a manner: some species conceal themselves within the leaf, and there feed upon its pulp, without breaking through the membranous tissue of the surface. Nay, even the thickness of a leaf, trifling though it be, is more than they require; the one-half of that extent giving scope enough for their operations. Of this, you can easily convince yourself, by examining the leaves of some of your rose trees, or of the common bramble of our hedges, or any of those indigenous plants of lowlier growth, which adorn the sloping bank, or perfume

the margin of the rivulet. On many of them you will perceive, on the upper surface, curious, irregular, and generally tortuous lines, presenting, however, some diversity both in form and colour. These are the indications which tell that the little mining caterpillars of some of our moths have been at work, and have been there enjoying their appointed food. There is truth, as well as poetry, therefore, in the description given by Thomson:—

—— "The flowery leaf
Wants not its soft inhabitants. Secure
Within its winding citadel, the stone
Holds multitudes. But chief the forest boughs,
That dance, unnumber'd, to the playful breeze,
The downward orchard, and the melting pulp
Of mellow fruit, the nameless nations feed
Of evanescent insects."—*Summer*, p. 50, ed. 1803.

The skilful and delicate manner in which these little beings conduct their operations, is so truly wonderful, that Young, after the descriptive line,

" Each flower, each leaf, with its small people swarm'd;"

does not hesitate to term the little artisans

"Those puny vouchers of Omnipotence."
Night Thoughts, N. 9.

It must have been the long-continued habit of observing them in their different modes of life,—of watching some assuming the lifeless appearance of twigs of trees; others, swinging on "their tree-rocked *cradles*," or excavating their fanciful dwell-

ings amid the foliage, that inspired Crabbe, when he penned the following passage :—

> "He knew the plants in mountain, wood, or mead;
> He knew the worms that on the foliage feed;
> Knew the small tribes that 'scape the careless eye,
> The plant's disease, that breeds the embryo fly;
> And the small creatures, who, on bank or bough,
> Enjoy their changes,—changed we know not how.
> But now the imperfect being scarcely moves,
> And now takes wing, and seeks the sky it loves."
>
> *Tales of the Hall*, Vol. I.

It is no mean recommendation of my favourite science, that she can thus discover, in the partial destruction of bark or foliage, a source of high intellectual gratification. When I consider, that every leaf may, in this manner, become a study, and one single tree supply a fund of pleasing thoughts, and grateful emotions, literally inexhaustible, I feel

> "I am as rich, in having such a jewel,
> As twenty seas, if all their sand were pearl,
> The water nectar, and the rocks pure gold."
>
> *Two Gentlemen of Verona*, Act II. Sc. IV.

In a former letter, I noticed "the want of analogy between the sensations of insects and our own;" on which interesting subject, a communication was made by the Rev. C. S. Bird, to the British Association for Science, 1832. In this paper, the arguments are in part founded on observations made on insects of the order now under consideration; and I accordingly feel warranted in presenting you with the following extracts on the subject.

"If in any case an insect feel pain, nothing, we should imagine, could call forth the feeling more than the act of passing a pin through its thorax, a part which we know to be peculiarly sensitive. It is, in fact, this very act of violence, equivalent to spearing a wild boar or a salmon, which is most revolting to observers; and if their compassion can be shown to be misplaced in this case, they will hardly, I believe, appeal to any other."

The reverend author, after mentioning the quiescent state of a moth when pierced, thus continues:—"The fluttering is the symptom, the only symptom, by which people in general are convinced that an insect is suffering; but here there was no fluttering. And then, to shew that even when it flutters, we are not hastily to infer pain, I have suddenly and abruptly touched a leg, or some other part of its body, but not so as to wound it, and alarmed the moth, after which it has began to flutter, and finding the restraint of the pin, has never ceased to flutter more and more, until I destroyed it. I conclude, therefore, that the violent struggles which excite so much pity in us before we know their cause, are merely the effect of alarm." *

To the accuracy of the facts here recorded, I am enabled to bear testimony from my own personal observation. On one occasion, last summer, a pret-

* *Entomological Magazine*, No. iii.

tily mottled moth (*Mamestra brassicæ*) was point
out to me, although scarcely distinguishable
colour from the lichen-coloured stone on which
slept. Stooping gently down, I passed a pin through
the thorax of the insect, until the point came in con-
tact with the stone underneath. No motion, not
even the slightest tremour, evinced its consciousness
of being thus transfixed; although, in the higher
animals, the most excruciating torture must have
followed such a process. But when I attempted to
move it, the case was altered. The feet were very
firmly attached to the surface of the stone, and
therefore, in lifting the moth from it, a slight degree
of violence was used. This awoke the slumberer,
and it instantly evinced by its motions the terror
and desire to escape, so accurately described by
Mr. Bird. Soon afterwards, I tried a similar experi-
ment on a moth of a different species (*Calyptra
libatrix*). On this occasion, I carried the insect down
four flights of stairs after its being transfixed with a
pin, showed it in its quiescent or seemingly torpid
state to some of my friends, and took it back to the
apartment whence it had been removed, without its
evincing the slightest indication of pain, or even
attempting to flutter, until touched and purposely
awakened. Without, therefore, arguing that insects
are incapable of bodily suffering, we may, from these
facts, safely infer that, contrasted with man, they are

endowed with a comparative insensibility to pain. "The probation" of this point, bears, I hope,

> —— "no hinge nor loop
> To hang a doubt on."—*Othello*, Act III. Sc. III.

When once the Lepidoptera have attained their perfect state, their lives are comparatively of short duration. To provide for the continuance of the species, seems, if not the sole, at least the principal object of their existence. The utmost care is evinced in selecting a proper place for depositing the eggs, and in attaching them to that place when chosen. Occasionally, however, some adverse circumstance happens to the parent, and prevents her usual procedure. In such cases, her primary object seems to be to deposit the eggs, and she does so even when dying. Hence the Entomologist will frequently find in his collecting-box, the eggs of the individuals he has taken during his excursion, and which had been transfixed and were apparently lifeless. On such occasions, the eggs are propelled almost in a continuous stream, and with astonishing rapidity. Their vast number is of itself a subject of surprise. On one occasion, a female of the ghost-moth (*Hepialus humuli*), had flown into my parlour and was secured. In less than half-an-hour afterwards, when the moth was quite dead, the number of eggs she had projected was such as to excite our wonder. We

counted one hundred, and as we had no delicate scales at hand to determine the matter by weight, we divided them into little parcels corresponding in bulk to that of the one hundred we had counted. There were seven similar parcels, making, as near as we could calculate by such means, eight hundred eggs deposited before death by the one insect. With such fecundity, we need not wonder, that after supplying food to thousands of "little trooping birds," each species is still preserved to fill its appointed place in the great scale of creation, and bear emblazoned on its wings evidence of Creative power, equal, in the mind of the philosopher, to that afforded by "the great globe itself."

"Marcus.—Alas! my lord, I have but kill'd a fly.
Titus.—But how, if that fly had a father and mother,
How would he hang his slender, gilded wings,
And buz lamenting doings in the air?
Poor, harmless fly!"

TITUS ANDRONICUS, ACT III. SC. II.

I have now, my dear Arnold, to call your attention to the insects belonging to the order Diptera. They are all furnished with two wings, as their name imports, and also with two halteres or poisers, which you will observe behind, and generally underneath the wings. The dipterous insects are very dissimilar

in size and form, and, in fact, present so many marks of distinction, that the British species at present described amount to nearly two thousand, and there are no doubt many with which we are yet unacquainted. I do not propose to bring before you the habits of the numerous families into which this vast assemblage of species is divided, but to confine myself principally to those mentioned by Shakspeare.

In a former letter I remarked, that the Poet seemed cognizant of at least three or four different kinds, each of which he distinguishes by some peculiarity in its habits. One of these was the flesh-flies, or those which prey on dead and decaying animal substances. The larvæ of some of these insects constituted the "convocation of politic worms," which Hamlet describes as busy on the dead body of Polonius. In a similar assemblage, one of the most admired writers of the present day has introduced the larva of the goat-moth, as the companion of the earth-worm :—

> —— "round him now the worms are met in council;
> Cossus and Lumbricus are chosen presidents:
> The one, because he is a judge of learning,
> And t' other has taste in flesh."
>
> *The Temptation.*—B. CORNWALL.

Without pausing, at present, to inquire why these individuals should be thus associated, or thus cha-

racterised, I return to Shakspeare. Now it is not a little remarkable, that while he seems to suppose that maggots were generated by the sun, or that "the sun breeds maggots in a dead dog," he was at the same time aware of the fact, that they are produced by a fly, who deposits on the decaying matter her eggs, or her larvæ. It is curious, that the two ideas could exist simultaneously—that the knowledge of the latter circumstance did not at once lead to the disbelief of the former. But in the history of human knowledge, we meet continually with such anomalies, and find the mind stopping short in the midst of error, just where one step farther would have placed it in the full effulgence of truth. The allusions to the flesh-flies, as the origin of the maggots, are numerous. When Trinculo has been taken out of "the filthy mantled pool," beyond the cell of Prospero, he replies to a question by Alonzo,—"I have been in such a pickle since I saw you last, that I fear me will never out of my bones; I shall not fear fly-blowing." (*Tempest*, Act V. Sc. I.) When Imogen, in the assumed character of Fidele, agrees to follow Lucius, she states her determination, in the first instance, to bury the supposed dead body of Posthumus, not for the purpose of doing it honour, but of protecting it from those insects:—

"I 'll follow, Sir. But first, an't please the Gods,
I 'll hide my master from the flies, as deep
As these poor pickaxes can dig."
Cymbeline, Act IV. Sc. II.

Ferdinand, when he avows his passion for Miranda, says, I

—— "would no more endure
This wooden slavery, than I would suffer
The flesh-fly blow my mouth."
Tempest, Act III. Sc. I.

And, not to multiply quotations unnecessarily, Shakspeare points out still more distinctly and unequivocally the connexion between the fly and the maggot, when he says—

—— "these summer flies
Have blown me full of maggot ostentation."
Love's Labour Lost, Act V. Sc. II.

Although our larders now and then suffer a little from the attacks of these flesh-flies, the benefits they confer outweigh a thousand times the injuries they occasion. They are the great preservers of the purity and salubrity of the air, by their instrumentality in consuming carrion, which, if left to decay by the decomposition of its particles, would taint the atmosphere around. To fit them the better for this important duty, they are gifted with astonishing powers, both of growth and of production. The young of one species (*Musca carnaria*) attain their full size in

five days, and the female will give birth to twenty thousand young. Hence the assertion of Linnæus, with regard to *M. vomitoria*, that three of these flies would devour a dead horse as quickly as a lion would do, astonishing as it may appear, is, perhaps, not overstrained.

Not only are those flies endowed with rapidity of growth, and extreme fecundity, but, to render those powers available for the purposes for which they are given, there is reason to believe that they possess an instinct which, instead of making them keep together for companionship, prompts them to scatter widely over the land in search of their fitting food, and congregate only at the very place where their services are required. Hence, they are constantly at hand when wanted, and without delay commence the fulfilment of their important task. I am the more tempted to make this remark, from a circumstance mentioned by my friend, Dr. J. L. Drummond. He had procured a number of the maggots of the common blue-bottle fly, and had put them into a glass vessel with a quantity of little pellets of paper, among which they quickly buried themselves, manifesting the utmost impatience to avoid the light. In about a month, they had undergone their change into pupæ, and were bursting their cases and assuming the imago form, at the moment he

chanced to direct his attention to them. For some time, he was delighted with observing the changes of colour, described by him in the following words, in his most deservedly popular work, "First Steps to Botany." "At first," the flies, after bursting from their chrysalid state, "are greyish white, with a waxy transparency; in a few seconds they became bluish, in a few more like the mainspring of a watch, and after some minutes, great part of them is grown quite black."* He soon, however, noticed, that after resting a little while on the walls of the apartment, they began to bestir themselves, and gained in time an open window, from which the back-yard of the dwelling-house was seen, surrounded on every side by high walls and buildings. The moment this position was attained, rest was at an end. They opened their wings and flew into the yard, not to rest upon its walls, but to hold their course right into the air, above the houses which hemmed them in, and thence scatter in every direction from the height they had attained. Of hundreds which were evolved from the pupæ cases, not one rested in the yard, but, from the window, darted right into the air, and held its unwavering flight upwards. Perhaps, under such circumstances, the wind might exercise a considerable influence on

* Second ed. p. 149.

their course, with respect either to its direction or extent. An idea that it has occasionally some such effect, pervades the words of Florizel, when he says—

> —— "So we profess
> Ourselves to be the slaves of chance, and flies,
> Of every wind that blows."
> *Winter's Tale*, Act IV. Sc. III.

The common blue-bottle fly (*Musca vomitoria*), on which those observations were made, is so well known, that it furnishes, in "King Henry the Fourth," an epithet applied by the abusive tongue of Doll Tear-sheet, to the beadle who had her in custody. She reviles him as a "blue-bottle rogue," a term evidently suggested by the similarity of the colour of his costume to that of the insect now under consideration. The habits of the fly, so busy, noisy, and restless, have caused Washington Irving to introduce it as an object of comparison in his inimitable story of the "Spectre Bridegroom." Baron Von Landshort, "a fuming, bustling little man," is busied with preparations for the expected arrival of his son-in-law; and we are told, "He worried from top to bottom of the castle, with an air of infinite anxiety; he continually called the servants from their work to exhort them to be diligent; and buzzed about every hall and chamber, as idly restless and as impor-

tunate, as a blue-bottle fly of a warm summer's day." *

The wanton cruelty too often exercised towards flies, is unfortunately a circumstance of common occurrence, and as such, must have fallen under the notice of Shakspeare. Accordingly, we find in "King Lear," that Gloster utters the reflection,

> "As flies to wanton boys, are we to the Gods;
> They kill us for their sport."—*Act IV. Sc. I.*

The ease with which this is effected, is implied in "As You Like It," by the phrase, "by this hand it will not kill a fly." (*Act IV. Sc. I.*) In "Titus Andronicus," we find that the killing of a fly is not merely mentioned, but is reprehended in very decided terms. When Titus and Marcus are seated together at a banquet, the former inquires,—

> "*Titus.*—What dost thou strike at, Marcus, with thy knife?
> *Marcus.*—At that that I have killed, my lord,—a fly.
> *Titus.*—Out on thee, murderer! thou killest mine heart;
> Mine eyes are cloy'd with view of tyranny.
> A deed of death done on the innocent,
> Becomes not Titus' brother. Get thee gone;
> I see thou art not for my company.
> *Marcus.*—Alas! my lord, I have but killed a fly.
> *Titus.*—But how, if that fly had a father and mother,
> How would he hang his slender, gilded wings,
> And buz lamenting doings in the air?
> Poor, harmless fly!—*Act III. Sc. II.*

Although the fly having "a father and mother,"

* Sketch Book, vol. i. p. 319, third ed.

would not, to the Entomologist, convey the inference which the Poet intended, the lesson of humanity will by no one be appreciated more highly than by him, because no one can estimate, as he does, the wonderful structure and functions of the insect; and although, for scientific purposes, he occasionally puts one to death, none would applaud more warmly the conduct of Uncle Toby, when, after he had caught the fly which had "buzzed about his nose, and tormented him cruelly all dinner time,"—"I'll not hurt thee, says my Uncle Toby, rising from his chair and going across the room with the fly in his hand,—I'll not hurt a hair of thy head. Go, says he, lifting up the sash, and opening his hand as he spoke, to let it escape, go, poor devil, get thee gone; why should I hurt thee? This world surely is wide enough to hold both thee and me."

The diminutive size of many dipterous insects is more than once indicated. Thus, Lear mentions not the gilded fly, but "the *small* gilded fly." And we are told that the driver of Queen Mab's equipage was not merely a grey-coated gnat, but that her Majesty had for

"Waggoner, a *small* grey-coated gnat."

The latter insect is again introduced as expressive of the very minimum of physical dimensions. Imogen is speaking of the departure of her lord:—

"I would have broke mine eye-strings; crack'd them, but
To look upon him, till the diminution
Of space had pointed him sharp as my needle;
Nay, followed him, till he had melted from
The smallness of a gnat, to air; and then
Have turn'd mine eye and wept."

Cymbeline, Act I. Sc. IV.

The manner in which these insects keep pace with the traveller, has been thus noticed by Wordsworth—

"Across a bare, wide common I was toiling
With languid feet, which by the slippery ground
Were baffled; nor could my weak arm disperse
The hosts of insects gathering round my face,
And ever with me as I paced along."

The Excursion.

The same poet has elsewhere admitted the cheerful influence of their humming:—

—— "'Tis now the hour of deepest noon.
At this still season of repose and peace.
This hour, when all things which are not at rest
Are cheerful—while the multitude of flies
Is filling all the air with melody,
Why should a tear be in an old man's eye?"

The Excursion.

The influence which the sun possesses in summoning those insects to their mazy dances in the air, or in sending them to their lurking places by withdrawing his beams, has not been passed by unheeded. Thus we read—

"When the sun shines, let foolish gnats make sport;
But creep in crannies, when he hides his beams."

Comedy of Errors, Act II. Sc. II.

And we have a further reference to the effect of a change of weather on this or some other genus, in the words—

> —— "One cloud of winter showers,
> These flies have couched."
> *Timon of Athens*, Act II. Sc. II.

Their assembling, as here described, is a fact with which even the most incurious observer is familiar, and on which the most refined may speculate. Why do they thus associate together? What principle impels them to join in the airy and ceaseless dance, that best evidence of their enjoyment? Perhaps no solution of this question can be more true, and at the same time more philosophical, than that afforded by the poet :—

> "Nor wanting here, to entertain the thought,
> Creatures that in communities exist,
> Less, as might seem, for general guardianship,
> Or through dependence upon mutual aid,
> Than by participation of delight,
> And a strict fellowship of love combined :
> What other spirit can it be that prompts
> The gilded summer-flies to mix and weave
> Their sports together in the solar beam,
> Or in the gloom of twilight hum their joy?"
> *Wordsworth.*

During the summer, many tribes of dipterous insects are seen in the joyous mazes here described. I have watched them over a small piece of water,

dancing a varied, yet not irregular figure, and performing, what a master of ceremonies would describe as like to that part of the Lancer quadrille, when the gentlemen turn off to the left, and the ladies to the right, meet at the lower end of the room, and advance again to their former stations. There was, however, this difference, that all the dancers on this occasion were what the master would call "les cavaliers," for "les dames," among the Diptera, are never known to partake of such amusements.

Sometimes, those tiny beings appear like clouds rising and falling in the air, or presenting, above plantations of trees, the aspect of wreaths of smoke ascending from the chimney of a cottage. Such is the appearance presented in the evening by *Culex detritus*, a species which was undescribed, until noticed about four miles from this town, by A. H. Haliday, Esq., of Clifden, one of the members of our Natural History Society. During the day, it was observed in multitudes among the sedges on the sea coast.* Any one who, at particular times, has travelled from Crumlin to Antrim, must have observed a similar phenomenon, arising from the myriads of *Culicidæ*, *Tipulidæ*, and *Ephemeridæ*, which exist in the vicinity of Lough Neagh.

The occurrence of a similar phenomenon in a

* List of Diptera, *Entomological Magazine*, No. ii. p. 151.

different part of this country, doubtless suggested to our Irish bard, the melodious author of the "Fairy Queen," the following beautiful simile :—

"As when a swarm of gnats at eventide
Out of the fens of Allan do arise,
Their murmuring small trumpets sounden wide;
Whiles in the air, their clustering armies flyes,
That as a cloud doth seem to dim the skyes;
Ne man nor beast may rest, or take repast,
For their sharp wounds, and noyous injuries,
'Till the fierce northern wind, with blust'ring blast,
Doth blow them quite away, and in the ocean cast."
Book II. Canto 16.

In every country, however, the abundance of some species of Diptera is a matter of common observation; and it is this fact which gives such effect to the words of the Babylonian monarch :—

—— "Everywhere, the countless multitudes,
Like summer insects in the noontide sun,
Come forth to bask in our irradiate presence."
MILMAN's *Belshazzar*.

So universally are they diffused, that their absence, combined with that of other insects, denotes more forcibly than almost any thing else could do, the solitary altitude described by Byron :—

"My joy was in the wilderness, to breathe
The difficult air of the iced mountain's top,
Where the birds dare not build, nor insect's wing
Flit o'er the herbless granite."
Manfred, Act II. Sc. II.

While in summer we remark several kinds of

insects enjoying these festive meetings, in winter we observe they are confined exclusively to the males of the *Tipulidæ*. These insects differ exceedingly in size and colour. Some (like *T. crocata*, abundant about Shane's Castle) are splendidly adorned with bands of yellow. Others, of larger dimensions, and more homely attire (*T. oleracea*), will amuse you, if you watch them as I have done, holding the body erect, while piercing the ground and depositing an egg, then moving an inch or two, and repeating the operation with untiring perseverance. It is, however, to the smaller kinds you are most likely to attend; for in every winter walk they force themselves on your notice, when the sun is at all warm, and your ramble not in an exposed locality. Even when the pond rings with the evolutions of the skaters, when Winter sits enthroned in all his regal splendour, apparelled in his "diadem of snows,"—there they are, undeterred by cold, unconscious of the torpidity of the scene around, disporting in a manner as cheerful as incessant. Often, when the quick motion of a smart walk has given rise to pleasurable emotions, which Dr. Johnson, in his post-chaise, might regard with envy, have I looked with delight upon these happy insects, and felt that their existence gave a new charm to the prospect.

Even at the most inclement season of the year, they occasionally appear in very considerable numbers. An instance of this recently occurred between Maghera and Dungiven, county Derry, and is thus mentioned in the *Northern Whig* of Thursday, the 7th of January, 1836:—"On yesterday, while the Belfast and Londonderry day coach was passing over Glenshane mountain, on its way to this town, it came repeatedly in contact with extensive and dense clouds of small flies, or midges. This very singular occurrence continued for nearly a mile." I found, on inquiry, that no one had thought of taking any specimens, so that I am unable to state what species of flies formed the vast assemblage thus noticed.

The countless multitude of summer flies do not all select a station so elevated as that I have now mentioned. Mr. Haliday states, in speaking of *Bibio lanigerus*,—"The first time I met with this species was in the beginning of April some years back, walking one sunny morning on a low, sandy spit, that runs into the bay at Hollywood, and is used for grazing cattle. I was struck by an appearance of innumerable sparkles of light over the short herbage, as far as I could see, resembling the reflections of the sun on a gentle ripple. On looking for the cause, I found the sward covered with species, principally males, who were in busy movement, exploring and

quartering their ground with the skill of a trained setter. The evident object of their search was the females, who, in the proportion of about one to fifty of their partners, were sitting sluggishly on the stems of the grass. I contined my walk for about three hundred yards, without perceiving any diminution of numbers. I then measured off a square foot, and counted within that space thirty-seven, and they did not appear thicker in that spot than in others. Though the species is still abundant in the season, I have never since witnessed an assemblage like this." *

Supposing that Mr. Haliday could see the "innumerable sparkles of light over the short herbage," for only twelve or thirteen yards on each side of him, the breadth of the space occupied by these insects would be twenty-five yards: as he walked "about three hundred yards without perceiving any diminution of numbers," we may suppose that they extended to at least a hundred yards further. The length multiplied by the breadth, and reduced to square feet, would give 90,000, and as a square foot, when they did not appear more numerous in that spot than in others, contained thirty-seven, the total number of insects would be three millions three hundred and thirty thousand. Perhaps, however, from the limited space

* Catalogue of Diptera occuring about Hollywood.—*Entomological Magazine*, No. ii. p. 179.

with respect to which the calculation is made, the multitude of insects might be double or treble this number, so that on a "low, sandy spit" of inconsiderable dimensions, and in view of the highway, we find animated millions enjoying life, revelling in all the bliss it affords,—endowed with wants, feelings, and instincts; and, but for the eye of the Entomologist, all these living creatures would have appeared and passed away without one human being having been aware of their existence.

Examples such as this teach us, what pride so often forgets,—that the world is not made for man alone, but that living myriads people each lonely spot, and enjoy the degree and kind of happiness of which they have been rendered capable by their Creator.

To the poet and the moralist, the fly has not unfrequently furnished a subject for reflection, and an object for comparison. The gaiety which seems inherent in the life of the insect, has been likened to that which marks the passage of the gay voluptuary, whose thoughts are absorbed by the present, and who heeds not the changes which time will inevitably bring. Impressed with this image, Lord Byron, who, like Shakspeare, has laid bare many of the secret workings of the heart, has thus written :—

> "Childe Harolde basked him in the noontide sun,
> Disporting there like any other fly;

Nor deem'd before his little day was done,
One blast might chill him into misery."
Canto I. St. IV.

In a similar spirit, Cowper, in his natural and reflective poem of "The Garden," has remarked,—

—— "The million flit as gay,
As if created only like the fly,
That spreads his motley wings in th' eye of noon,
To sport their season, and be seen no more."

The same idea appears still more amplified in Gray's delightful "Ode to Spring." After he has told us—

"The insect youth are on the wing,"

mentioned the habitats of some, and the "gilded trim" of others

"Quick glancing to the sun,"

he proceeds to develope the reflections awakened by their appearance:—

"To Contemplation's sober eye,
Such is the race of man;
And they that creep, and they that fly,
Shall end where they began.
Alike the busy and the gay,
But flutter through life's little day,
In Fortune's varying colours dress'd,
Brush'd by the hand of rough Mischance,
Or chill'd by Age, their airy dance
They leave, in dust to rest."

You will see, therefore, my dear friend, that in this, as in other departments of my favourite science, the objects are not only interesting themselves, but

the source of ideas, which many would deem even more interesting.

You will readily call to mind passages from the classics, in which these diminutive beings are brought forward. Nay, occasionally, they are mentioned amid circumstances, which at first sight seem, by their importance, to forbid the introduction of "such small deer." Of this kind, is that passage in the "Agamemnon" of Æschylus, where Clytemnestra is reciting to her lord, who has returned triumphant from the siege of Troy, her "melancholy life" during his absence :—

> —— "At thy return,
> The gushing fountains of my tears are dried.
> Save that my eyes are weak with midnight watchings,
> Straining, thro' tears, if haply they might see
> Thy signal fires, that claim'd my fix'd attention.
> If they were closed in sleep, a silly fly
> Would, with its slightest murm'rings, make me start,
> And wake me to more fears."
>
> *Potter's Translation*, p. 189.

On Virgil's instructions for generating swarms of bees from the

> "putrid gore of oxen slain,"—(*Georgic. IV.*)

I have thought it unnecessary to make any comment, some species of flies busy about the fermenting carcase, having obviously been mistaken for bees.

I must now call your attention to the annoyance which flies in warm climates occasionally become,

and to a curious and unexplained mode of defence which has lately been made public. In the first scene in the tragedy of "Othello," we find Iago, in speaking of the Moor, use the remarkable words,—

> "And tho' he in a fertile climate dwell,
> Plague him with flies."

Othello had at that moment succeeded in carrying off the gentle Desdemona. The malice of Iago might annoy, but not injure him; or, as he himself expresses it, in speaking of the Moor,—

> —— "Though that his joy be joy,
> Yet throw such changes of vexation on it,
> As it may lose some colour."

Those words are supposed to be spoken at Venice, where, from the multitude of canals,* and the low situation of the city, flies of many kinds must be supposed to abound; especially those whose larvæ are aquatic. In point of fact, flies constitute "the first of torments in Spain, Italy, and the olive district of France." "It is not," continues Arthur Young, "that they bite, sting, or hurt, but they buz, teaze, and worry. Your mouth, eyes, ears, and nose, are full of them; they swarm on every eatable; fruit, sugar, milk,—every thing is attacked by them in such myriads, that if they are not driven away incessantly

* The canals of Venice give birth to myriads of gnats.

by a person who has nothing else to do, to eat a meal is impossible."*

The mode by which these intruders are excluded from dwelling-houses, is detailed by W. Spence, Esq., one of the authors of that "Introduction" which I have so frequently quoted. I shall use the words employed by him in his communication to the Entomological Society:—"If my curiosity was excited by this statement, my surprise was not lessened by being told, in explanation of the apparent impossibility of thus excluding flies from a room with unclosed windows, that in point of fact the openings of the windows were covered with a net, but with a net made of white, or light-coloured thread, and with meshes an inch or more in diameter; so that there was actually no physical obstacle whatever to the entrance of the flies, every separate mesh being not merely large enough to admit one fly, but several, even with expanded wings, to pass through at the same moment, and that consequently, both as to the free admission of air, and of the flies if they had chosen, there was practically no greater impediment than if the windows were entirely open, the flies being excluded simply from some inexplicable dread of venturing across the thread-work."† The cause of their

* Travels, vol. ii. p. 35.

† Transactions of Entomological Society, vol. i. p. 3.

seeming terror, Mr. Spence professes himself unable to explain; but he marks out very judiciously several points of inquiry which are calculated to throw light on this anomalous subject.

You, perhaps, are not aware, that the common gnat of Britain (*Culex pipiens*) is supposed to be identical with the dreaded mosquito of other European countries, and of the northern parts of Asia and America. Although we suffer but comparatively little annoyance from the attacks of such insects, I should scarcely be warranted in omitting all reference to the torment they occasion in other climates, and the manner in which they modify, in some respects, the domestic economy of man. They seem to be able

"The fierce extremes of *heat* and *cold* to brook;"

for they are found no less abundant among the "thick-ribbed ice" of Lapland, than in regions exposed to the full influence of a tropical sun. Of the annoyance they occasion in India, Captain Basil Hall gives so vivid a description, that, like the unfortunate wight, within the gauze curtains of whose bed a "villainous mosquito" has gained admission, we "can almost fancy there is scorn in the tone of his abominable hum."* Dr. Clarke states, in his Journey along the frontier of Circassia, that the Cossack soldiers "pass

* Fragments of Voyages and Travels, Third Series, vol. ii. p. 66.

the night upon the bare earth, protected from the mosquitoes by creeping into a kind of sack, sufficient only for the covering of a single person." In a note, he adds, that the Cossacks sometimes scoop a hollow in the ancient tombs, or construct a shed of reeds in these places, and light large fires in order to fill the area with smoke; flying to their suffocating ovens, in the most sultry weather, to escape the mosquitoes. Yet, notwithstanding all these precautions, many of the soldiers stationed along the Kuban died in consequence of mortification produced by the bites of these insects.* Humboldt informs us, in speaking of one district in the equinoctial regions of the New Continent, "that the superior of the Missions, when he would make the lay brothers return to their duty, menaces sometimes to send them to Esmeralda; that is, say the monks, to be condemned to moschettoes; to be devoured by these buzzing flies, with which God has peopled the earth to chastise man."† Elsewhere, the same philosophical writer remarks,—"It were to be wished, that a learned Entomologist could study, on the spot, the specific differences of these noxious insects, which, in spite of their littleness, act an important part in the economy of nature.

* Travels in Europe, Asia, and Africa. By Edward Daniel Clarke, LL.D. Second ed. p. 387.

† Personal Narrative, vol. v. p. 508.

What appeared to us very remarkable, and is a fact known to all the missionaries, is, that the different species do not associate together, and that at different hours of the day you are stung by distinct species. Every time that the scene changes, and, to use the simple expression of the missionaries, other insects "mount guard," you have a few minutes, often a quarter of an hour, of repose." *

How constant must be the suffering, when a respite of a few minutes is a fact too obvious to escape general observation! and what reason have we to be thankful, that we are free from such incessant torment!

But among the multitude of flies to which my attention has been directed in the course of the present letter, I had almost forgotten one species, mentioned by Shakspeare himself, under the name of "Brize." It is that we usually term the gadfly (*Œstrus bovis*). With its habits, your present residence in the country will afford you ample opportunities of becoming acquainted; and, in fact, the terror which it inspires among our herds, is such as to attract the notice of the most superficial observer. In this, as in many other instances, we find our poets furnish us with the most striking, and, at the same time, the most accurate description. The gadflies appear during the

* Personal Narrative, vol. v. p. 93.

hottest portion of our summer; and hence, among the phenomena characteristic of that season, Thomson depicts the effect which their attack produces on a herd of cattle :—

—— "Tossing the foam,
They scorn the keeper's voice, and scour the plain,
Through all the bright severity of noon:
While from their labouring breasts, a hollow moan
Proceeding, runs low-bellowing round the hills."

From the sudden consternation and precipitate flight of the cattle, Shakspeare introduces a comparison, which, though not descriptive of one who, like Cleopatra, beggar'd all description, marks well the abruptness and sudden phrenzy of her retreat from the naval conflict, and is highly appropriate in the mouth of the excited Scarus :—

—— "Yon ribald nag of Egypt,
Whom leprosy o'ertake! i' the midst o' the fight,—
When vantage like a pair of twins appear'd
Both as the same, or rather ours the elder,—
The brize upon her, like a cow in June,
Hoists sail, and flies."
Antony and Cleopatra, Act III. Sc. IX.

In another line, Shakspeare has indicated even more strongly the sufferings which cattle endure from this insect :—

"The herd hath more annoyance by the brize
Than by the tiger."—*Troilus and Cressida*, Act I. Sc. III.

Now it is not a little curious, that the terror thus

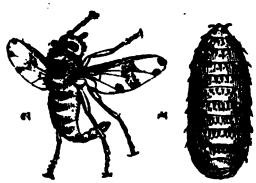
evinced by our cattle does not, in the opinion of Mr. Bracey Clarke,* proceed from the infliction of a painful wound, but solely from the alarm occasioned by a peculiar sound emitted by the Œstri, while hovering for the purpose of oviposition. This view would corroborate the description given by Virgil, both as regards the existence of such a sound, and its apparent effect upon the herd. The remarkable accuracy of the passage has induced Kirby and Spence† to present it to their readers in the following translation, which I transcribe, that you may have the pleasure of comparing it with the original :—

> "Through waving groves, where Selo's torrent flows,
> And where, Alborno, thy green Ilex grows,
> Myriads of insects flutter in the gloom,
> (Œstrus in Greece, Asilus named at Rome),
> Fierce and of cruel hum. By the dire sound,
> Driven from the woods and shady glens around,
> The universal herds in terror fly;
> Their lowings shake the woods and shake the sky,
> And Negros' arid shore."—*Georgics*, Book III.

The whole history of the Œstri is singular; and the ox, the horse, and the sheep, in these countries, are alike subject to their attack, but in different ways. The species which attacks the ox (*Œ. bovis*) deposits its eggs on the back of the animal. These,

* Linnæan Transactions, vol. xv. p. 407.
† Introduction, vol. i. p. 149.

when hatched into grubs, produce the tumours so well known among the country people by the name of "wurbles." One of the species devoted to the horse (*Gasterophilus equi*), lays its eggs, not indiscriminately



Gasterophilus Equi.

over the body, but about the parts which are most liable to be licked by the tongue of the animal. They are thus taken into the stomach, and transformed into larvæ, in this country universally termed "bots." As the connexion of these creatures with a two-winged fly was in former times unknown, it is no wonder that their origin was attributed to other causes. Hence, Mr. Clarke, in the able Memoir already quoted, remarks,—"Our ancestors imagined that poverty, or improper food, engendered these animals, or that they were the offspring of putrefaction. In Shakspeare's "Henry the Fourth," Part I., the ostler at Rochester says, "Pease and beans are as dank here as a dog; and that is the way to give poor jades the bots;" and one of the misfortunes of the miserable

nag of Petruchio is, that "he is so begnawn with the bots."

Without entering on the peculiar habits of the sheep-fly (*Œ. ovis*), I shall now conclude this brief notice of some of our British Œstri, whose obscure and singular habitations are the stomach and intestines of the horse, the frontal and maxillary sinuses of sheep, and beneath the skin of the backs of horned cattle."* They form, however, a striking example of the influence exerted by insects over the health and comfort of our domestic quadrupeds.

To you, it may, perhaps, be interesting to examine what has been said of them by classical writers, and to enter into the question, whether or not the Oistros of the ancients was, or was not, the insect to which the same name was applied by Linnæus. If so, I refer you to two papers in the "Transactions of the Linnæan Society," advocating conflicting opinions on this subject, the negative being contended for by Mr. W. S. Macleay (vol. xiv. p. 353), and the affirmative maintained by Mr. Bracey Clarke (vol. xv. p. 402). One thing, however, is obvious,—that the inquiry proposed has not been deemed uninteresting by that learned body, which has thus devoted many pages of its valuable "Transactions," to

* Mr. B. Clarke, Linn. Trans. vol. iii. p. 291.

determine the identity of one of those two-winged insects which have formed the subject of my present communication.

I now take leave of the Diptera; but before doing so let me call your attention to a passage, which I frankly confess my inability to elucidate. In "Henry the Fifth," Act V. Sc. II., he makes Burgundy say—"Maids well summer'd and warm kept, are like flies at Bartholomew tide,—blind, though they have their eyes; and then, they will endure handling, which before would not abide looking on." This curious comparison is passed over in silence by all the commentators to whose notes I have had access; and even Douce, who has shed his antiquarian lore over so many ancient customs and opinions, is on this point altogether silent. Among school-boys, in some parts of the country, there is a prevalent idea, that flies become blind about the beginning of autumn, which is the very belief which Shakspeare has laid hold of, and thus embodied. But still the question naturally recurs, how could such an opinion ever have become general? As the house-fly (*Musca domestica*) has not lost its activity so early as the 24th of August, Mr. Haliday has suggested to me that *Musca rudis*, which begins to swarm about windows at the approach of autumn, might be the

species alluded to. Its stupid inaction, which is so great that the fly appears almost devoid of the power of movement, would countenance this supposition. But still, it does not explain why the insect should be supposed to be blind. Sluggish, it certainly is; but why should it be represented as deprived of sight? Perhaps you can ferret out for me some "tale of the times of old," some forgotten legend, some expected superstition, which may irradiate the origin of the belief now shrouded in the gloom and uncertainty of former ages.

On the habits of the little insect which figured upon Bardolph's nose, it is not my intention to enlarge. I mentioned formerly, that it belonged to the order Aphaniptera, and described the apparatus by which it inflicts a wound. I now merely remark, that from the frequent mention of it by Shakspeare, it is evident there was no scarcity of them in "merrie England" during the days of good Queen Bess. The carriers in "Henry the Fourth," complain of them.* They are alluded to in the colloquy between Shallow and his man Davy.† And even the Duke of Orleans, without reproach to manhood be it spoken, is represented as saying to the Constable of

* Henry IV., First Part, *Act II. Sc. I.*
† Henry IV., Second Part, *Act V. Sc. I.*

France, "That 's a valiant flea that dare eat his breakfast on the lip of a lion."* Sir Toby Belch indicates his opinion of the valour, or rather of the want of valour, in Sir Andrew Ague-cheek, by the assertion, "If he were opened, and you find so much blood in his liver as will clog the foot of a flea, I'll eat the rest of the anatomy."† And Mrs. Ford shows she has been a witness to the execution of at least one of these "wild fowl," when she exclaims, as her jealous husband searches the clothes basket, "If you find a man there he shall die a flea's death."‡ However, all these authorities may not inspire you with any admiration for the insect. Even its astonishing strength, sufficient to draw miniature coaches and cannon, and its leaps, so disproportionate to its size, may fail to make you regard it with complacence. To you, the old lady mentioned by Kirby and Spence may appear to have been singular in her taste, when she exclaimed—"Dear, miss, don't you like fleas! well, I think they are the prettiest little, merry things in the world. I never saw a dull flea in all my life." § If such be the case, I shall not ask you to forego your old opinions; but I trust, when you are

* Henry V., *Act III. Sc. VII.*
† Twelfth Night, *Act III. Sc. II.*
‡ Merry Wives of Windsor, *Act IV. Sc. II.*
§ Introduction, vol. i. p. 100.

musing on the lofty pre-eminence of "man, proud man," and chance to suffer from these little assailants, you will imbibe a lesson of humility from their attack, and say in the spirit, if not in the words of the banished Duke:—

—— "These are counsellors,
That feelingly persuade me what I am."
As You Like It, Act II. Sc. I.

"Weaving spiders, come not here:
Hence, ye long legg'd spinners, hence."
MIDSUMMER NIGHT'S DREAM, ACT II. SC. III.

It might appear strange to you, my dear friend, if among the insects mentioned in Shakspeare's plays, I did not mention the spider. Perhaps it may seem more strange to say, that it *is not an insect at all*. Still, although such is the case, I shall bow at the shrine of custom, and allow the spider to form the subject of a letter, in the same manner as if the popular classification were correct.

Spiders are not arranged by Naturalists with insects properly so called, but occupy a place between

crabs, lobsters, &c., or crustaceous animals, and those now designated as insects. The position thus allotted to them is just, from a consideration of their physical structure. They have no antennæ, those flexile appendages somewhat resembling horns, which you have a thousand times observed in the butterfly; and which have been supposed, by various authors, to be organs of hearing, of smell, of feeling, or of some unknown sense, although the opinion that they are organs of touch, is that now generally received. Spiders, on their liberation from the egg, are perfectly formed, although very minute, and they do not, like insects, undergo transformations. Many of them breathe through lungs, and hence their respiratory apparatus forms another ground of distinction. Still, as we are, in common parlance, in the habit of speaking of them as insects, a slight notice of their habits cannot be altogether out of place.

They are all predaceous, and live upon small insects, which they are able to overcome. This is effected, however, in very different ways. Some spin the webs, which are the abhorrence of all tidy housekeepers; others construct those nets, which, when glittering in the morning sun, and bright as the dewdrops by which they are surrounded, every one has at some time or other regarded with admiration;

others do not take the trouble of weaving, but, choosing a place of concealment, "in ambush wait" the approach of their unsuspecting prey. It is, probably, of this kind, that the Prisoner of Chillon speaks, when he says,—

> "With spiders I had friendship made,
> And watch'd them in their sullen trade."
>
> *Stanza XIV.*

Another tribe, distinguished by the appropriate name of "Hunters," are for ever roaming about, "seeking whom they may devour." The singular habits of the *Arachnidæ*, but more especially of those which construct nets for the capture of their insect food, have in all ages attracted attention; and the natural sympathy we feel in seeing the weak overcome and destroyed by a foe too powerful for them to oppose, and which unites stratagem to strength, has caused the spider to be considered as

> ——— "cunning and fierce,
> Mixture abhorr'd."
>
> THOMSON'*s Summer.*

I shall not lose time by endeavouring to vindicate its character, convinced that you will not deem any animal cruel, which exercises for its support those instincts with which it has been endowed by its Creator; but shall proceed to direct your attention

to some of those passages in which Shakspeare evinces his knowledge of the habits of spiders, and his cognizance of the general feeling of mankind concerning them.

When, in the "Merchant of Venice," Bassanio has opened the leaden casket containing "fair Portia's counterfeit," and is giving vent to the admiration which so excellent a delineation of her beauty excites, his words allude to the destruction which the spider's web promotes:—

> —— "Here, in her hairs,
> The painter plays the spider, and hath woven
> A golden mesh to entrap the hearts of men
> Faster than gnats in cobwebs."—*Act III. Sc. II.*

To the same insect, Plantagenet compares the state of his own mind:—

> "My brain, more busy than the labouring spider,
> Weaves tedious snares to trap mine enemies."
> *Second Part King Henry VI.*, Act III. Sc. I.

The epithets "labouring" and "tedious," are applied with peculiar felicity, for they denote the protracted labours, the industry and perseverance, evinced in the fabrication of the snare.

When Queen Margaret is hurling imprecations on her enemies, she is turned from her encounter with Gloster, by a remark made by the Queen: and while

a pitying spirit seems for a moment to supplant her rage, she addresses her successor in the words—

> "Poor, painted Queen! vain flourish of my fortune!
> Why strewest thou sugar on that bottled spider,
> Whose deadly web ensnareth thee about?"
>
> *Richard III.*, Act I. Sc. III.

In another part of the same play, the epithet "bottled," is again applied in a similar manner:—

> "That bottled spider, that foul hunchback'd toad."
>
> *Act IV. Sc. IV.*

And in both instances we may suppose it is used on account of the peculiar shape of the spider's body.

The weakness of the web is almost proverbial: hence it is employed by Job, in speaking of the hypocrite,—"Whose trust shall be a spider's web" (c. viii. v. 14).

In a similar signification it has been most appropriately employed by Young—

> "The spider's most attenuated thread
> Is cord, is cable, to man's tender tie
> On earthly bliss; it breaks at every breeze."
>
> *Night Thoughts*, Night I.

In foreign countries, instances very much the reverse of this might be brought forward; for the threads spun by spiders form no inconsiderable obstacle to the progress of a man through the woods where they

abound, as a friend of mine at Sierra Leone has not unfrequently experienced. In France, gloves and stockings have been fabricated of their silk, but in this country it is characterised by extreme fragility. Hence, the spider's web is mentioned by Falconbridge, when impressing on Hubert, after the death of Arthur, the conviction, that the slightest and most trifling thing would be sufficient for his destruction, if accessory "to this deed of death:"—

> "If thou did'st but consent
> To this most cruel act, do but despair,
> And if thou want'st a cord, the smallest thread
> That ever spider twisted from her womb,
> Will serve to strangle thee."
>
> *King John*, Act IV. Sc. III.

Slight, and even simple as the threads of the spider may appear, they are not so in reality; and this forms one of the many examples in which the eye of the Naturalist discerns some concealed elegance or complex mechanism, in things which are daily before "the eyes of men," and yet are never seen as they are seen by him. The observations of Reaumur and Leeuwenhoek have incontestably shown that a "spider's thread, even spun by the smallest species, and when so fine that it is almost imperceptible to our senses, is not, as we suppose, a single line, but a rope composed of at least four thousand strands!"*

* Kirby and Spence, vol. i. p. 405.

In the equipage of Queen Mab,

"The traces of the smallest spider's web,"

are in keeping with the rest of her appointments; and well were they adapted for her regal state, for no eastern potentate ever harnessed his foaming steeds by traces of so complicated a structure.

Epeira diadema.

The web of the common house-spider has long been employed in stopping the effusion of blood. This has not escaped the all-pervading eye of Shakspeare; and hence, Bottom, in addressing one of his fairy attendants, says,—

"I shall desire you of more acquaintance, good Master Cobwe b
If I cut my finger, I shall make bold with you."
Midsummer Night's Dream, Act III. Sc. I.

Its medicinal virtues do not end here, for Professor

Hentz states, that the web "is narcotic, and has been administered internally, in some cases of fever, with success." *

The threads composing the webs of the house-spiders appear to be formed entirely of one kind of silk, and flies are caught by their claws being entangled in the meshes. It is not so with those which are situated in the open air, and which exhibit so much regularity of structure, as to be termed Geometric. Mr. Blackwall, in a late number of the "Transactions of the Linnean Society," states, that "they are composed of three kinds of silk; and that although the nets lose their viscidity when exposed to the influence of sun and weather, yet, when artificially protected from the effects of these, they retain it almost unimpaired for many months." † In those webs, the threads forming the circles are closely studded with minute dew-like globules, which, in fact, are composed of a viscid gum, sufficiently adhesive to retain the insects which fly into the net. Those concentric circles lose their viscidity by exposure to the air, and in ordinary circumstances are renewed every twenty-four hours. ‡

Shakspeare seems, in my opinion, to have been aware that there are differences in the habits of

* Silliman's "Journal of Science," October, 1831, p. 103.
† Entomological Magazine, No. v. p. 446.
‡ Kirby and Spence, vol. i. p. 419.

spiders; some of them constructing nets, and others not doing so. I am led to form this belief, from a passage in the "Midsummer Night's Dream." Titania is reclining on the bank "whereon the wild thyme blows," and her fairy attendants are obeying her commands, "Sing me now asleep:"—

> "Weaving spiders, come not here;
> Hence, ye long-legged spinners, hence.
> *Act II. Sc. III.*

By "weaving spiders," must of course be meant some of those which construct nets in the open air; but the words "long-legged spinners," do not seem to me to be a synonymous expression, but to denote an entirely different tribe. Of those long-legged, or shepherd spiders (*Phalangidæ*), which do not spin nets, but seize their prey by violence, Latreille says—"La plupart vivent à terre, sur les plantes, au bas des arbres, et sont très-agiles; d'autres se cachent sous la pierre, dans la mousse." * They, of course, would naturally abound in situations similar to that in which Titania is placed. The word "spinner," may justly, I think, be considered as a generic term for spider, and not as indicating that the one to which it is applied actually spins. This inference does not appear to be unnatural or improbable;—

> "The court awards it, and the law doth give it;"
> *Merchant of Venice*, Act IV. Sc. I.

* Le Régne Animal, tome iii. p. 114. Paris, 1817.

and, if I am right in my conjecture, the passage furnishes another proof that what Shakspeare describes is true and correct, for it is that which "he has seen with his own eyes."

My single-hearted and talented friend, Sheridan Knowles, has very happily noticed the spider, the snail, and the nut-worm, in his popular drama of the "Hunchback." Helen is rallying Julia on her declaration—"I'm constancy:"—

> —— "I'm glad I know thy name!
> The spider comes of the same family,
> That in his meshy fortress spends his life,
> Unless you pull it down, and scare him from it.
> And so thou 'rt constancy? Art proud of that?
> I'll warrant thee, I'll match thee with a snail,
> From year to year that never leaves his house!
> Such constancy, forsooth!—A constant grub,
> That houses ever in the self-same nut
> Where he was born; till hunger drives him out,
> Or plunder breaketh thro' his castle wall!
> And so, in very deed, thou 'rt constancy!"—*Act I. Sc. II.*

All spiders are furnished with a poisonous fluid, conveyed in their fangs; but its effects seem to have been greatly over-rated. There is one species (*Theridium verecundum*) mentioned by Professor Hentz, in the paper already quoted, as being well known in the Southern States of America, the people there considering its bite to be very poisonous. A glass of brandy is stated, however, to produce instant relief, and to arrest the violent symptoms arising from its

bite, by inducing a reaction in the system. I am not aware that any of our native *Arachnidæ* have occasioned actual suffering to man; yet, that they are full of venom, is the universal belief; and in accordance with it, King Richard II., in saluting the "dear earth" on which he stands, after

—— "late tossing on the breaking seas,"

accosts it thus:—

"Feed not thy sovereign's foes, my gentle earth,
Nor with thy sweets comfort his ravenous sense;
But let thy spiders, that suck up thy venom,
And heavy-gaited toads, lie in their way,
Doing annoyance to the treacherous feet,
Which with usurping steps do trample thee."
Act III. Sc. II.

From another passage, it is evident that Shakspeare believed that any injury a spider might occasion, arose more from the imagination of the sufferer than the venom of the spider:—

—— "There may be in the cup,
A spider steep'd, and one may drink, depart,
And yet partake no venom; for his knowledge
Is not infected; but if one present
The abhorr'd ingredient to his eye make known,
How he hath drunk, he cracks his gorge, his sides,
With violent hefts."—*Winter's Tale*, Act II. Sc. I.

It is gratifying to the Naturalist, to find in a being regarded by the bulk of mankind as so obnoxious, the manifestations of parental attachment. On the

genus *Lycosa*, Professor Hentz remarks,—"We may witness astonishing instances of maternal tenderness and courage, and that, too, in the most cruel race of animals; a race, in which ferocity renders even the approach of the sexes a perilous act, and condemns every individual to perpetual solitude and apprehensions of its own kind. When a mother is found with the cocoon containing the progeny, if this be forcibly torn from her, she turns round and grasps it with her mandibulæ. All her limbs, one by one, may then be torn from her body, without forcing her to abandon her hold. But if, without mangling the mother, the cocoon be skilfully removed from her, and suddenly thrown out of sight, she instantaneously loses all her activity, seems paralyzed, and coils her tremulous limbs as if mortally wounded: if the bag be returned, her ferocity and strength are restored the moment she has any perception of its presence, and she rushes to her treasure to defend it to the last." *

The harmony which nature has established between ths colours of these insects and the places which they inhabit, must not be passed in silence. The species of *Epeira*, which weave their webs in the air, the *Thomisi*, which hide themselves in flowers, and the *Sparassi*, which run over the green sward,

* Silliman's "Journal of Science," Oct. 1831, p. 197.

have the body either of an uniform lively green, yellow, or purple colour, or varied with handsome markings; whilst the *Mygale*, *Lycosæ*, and *Araneæ*, which conceal themselves under stones and in obscure situations, are of brown, black, or other obscure colours, like the places where they reside.

I must not leave this part of my subject without referring to the silvery threads of gossamer, which are so frequently seen extending from bush to bush, from furrow to furrow, and glancing with iridescent brightness in the morning sun. Their origin was formerly unknown. Spencer speaks of them as "scorched dew;" and Thomson mentions, in his "Autumn," "the filmy threads of dew evaporate;" which no doubt refers to the same object. The gossamer is now known to be the production of a minute spider. It is twice mentioned by Shakspeare; but not in connexion with the little being from whom it originates, and with which he was most probably unacquainted. One of the passages is familiar to every one:—

> "A lover may bestride the gossamer,
> That idles in the wanton summer air,
> And yet not fall, so light is vanity."
>
> *Romeo and Juliet*, Act II. Sc. VI.

and the other is put into the mouth of Edgar, when

he accosts his father, after his supposed leap from that

> "Cliff, whose high and bending head
> Looks fearfully on the confined deep."—
>
> "Had'st thou been aught but gossamer, feather, air,
> So many fathom down precipitating,
> Thou had'st shiver'd like an egg."
>
> *Lear*, Act IV. Sc. VI.

In both instances, it is expressive of extreme lightness. In the same manner, is is used by Hogg, in the "Queen's Wake:"—

> "Light as the fumes of fervid wine,
> Or foam belts floating on the brine,
> The gossamers in air that sail,
> Or down that dances in the gale."

And the same poet has introduced it as a vehicle fit for the fairy bands, which he describes as

> —— "sailing mid the golden air
> In skiffs of yielding gossamer."

Thus, beautiful in its appearance, and rich in poetic associations, the "restless gossamer"* comes recommended to our notice, and courting our inquiry. But the subject is still involved in obscurity, and is one of those in which your own personal observation might solve many doubts, and explain many difficulties. Two opposite opinions respecting it have been ably advocated by authors, both of whom are

* Coleridge's "Ancient Mariner."

entitled to high respect and consideration. One of these gentlemen, Mr. John Murray, says,—"The aeronautic spider can propel its threads both horizontally and vertically, and at all relative angles, in motionless air, and in an atmosphere agitated by winds; nay, more, the aerial traveller can even dart its thread, to use a nautical phrase, in the "wind's eye." My opinion and observation are based upon many hundred experiments. The entire phenomena are electrical." *

Mr. Blackwall, on the other hand, states, and I concur in his opinion, that the glutinous matter emitted from the abdomen is carried out into a line, only in those situations where the insects are exposed to a current of air. When a glass bell was placed over them, they "remained seventeen days, evidently unable to produce a single line by which they could quit the branch they occupied, without encountering the water" in which its base was immersed.† From this, and many subsequent experiments, Mr. Blackwall is "confident in affirming that, in motionless air, spiders have not the power of darting their threads even through the space of half an inch." ‡

It is not a little singular, that many very accurate

* Insect Architecture, p. 345.
† Linnean Transactions, vol. xv. pt. ii. p. 456.
‡ Magazine of Natural History, vol. ii. p. 397.

observations on this subject were made by President Edwards, when he was only twelve years of age. They are detailed by him in a letter written in 1715, and published in a New York edition of his works, in 1829. It is republished in Silliman's "Journal of Science," Vol. xxi., with many interesting remarks from the learned editor of that periodical; and it countenances the opinion, that it is by the action of the "gently moving air," that the thread is drawn out to what length the spider pleases.

The threads of the gossamer are more abundant in autumn than at any other period of the year. But I have seen them at all seasons, and never with greater pleasure, than when crusted with hoar-frost, and glittering like little garlands of minute icicles. In fact, they delighted me so much in their new garb, that I took the earliest opportunity afterwards, of embodying in rhyme the ideas which they suggested. To you, I shall make no apology for the imperfections of the verses, for I do not fear your criticism. The criticism of a friend, like "the quality of mercy, is not strained," and "blesseth him that gives, and him that takes."

It was a pleasant winter morn;
Through all the silent night,
The skies had been of azure hue,
And countless stars were bright.

The sun in golden glories came,
And shot his glancing ray
Across the woods, and o'er the fields,
With hoar-frost glittering gay.

That lovely, pearly, brilliant frost,
The landscape overspread,
Like cold and fleeting beauties, which
Adorn the youthful dead.

In every field each blade of grass,
On every tree each spray,
Was with fantastic garlands hung,
As for some festal day.

And yet as numberless and bright,
And beautifully placed,
As though Titania's fairy train,
The fading leaves had graced.

What could they be? I paused to gaze,
And soon delighted found,
They were the gossamer's light threads,
With ice encrusted round.

That thread was like the poet's thought,
The child of sunny hours,
Which often is by ice conceal'd,
Or swept away by showers.

The icicles which clustered round
That graceful, fragile thread,
Were brilliant as an infant's dream,—
Pure as the sainted dead.

They were like human loves, which hang
By links as frail and light,
A breath may rend them, and, alas!
They ne'er can reunite.

As dew they would have gaily shone,
  Kiss'd by the morning breeze;
As icicles, how changed they are,
  Yet not the less they please.

Thus, o'er all Nature's works, we see
  That Beauty walks abroad;
And every change is lovely there,
  Because ordain'd by God.

"Full of wise saws and modern instances."
AS YOU LIKE IT, ACT II. SC. VII.

I REJOICE, my dear friend, at the willingness you now express to enter into my favourite pursuit, and at the alacrity which breathes throughout the entire of your last letter. I hail it as the intimation that your apathy has been dispelled, that your listlessness has been flung aside, and that your vigorous and cultivated mind is about to find full employment for its varied powers of action.

"The gorgeous insect hovering in the air,"

will not monopolize your attention, although it will rouse your admiration. The less conspicuous inhabitant of the "impregnable and gnarled oak," whether residing in the leaves or in the trunk, will be sought for,—places you formerly regarded as "barren, barren, barren," will now be explored,—

"The green myriads in the peopled grass,"

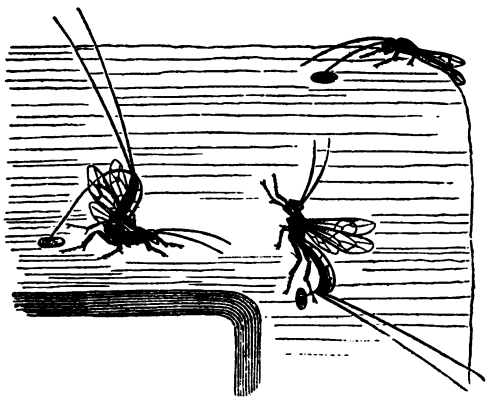
will be examined,—and

"By paved fountain, or by rushy brook,
Or on the beached margent of the sea,"
(*Midsummer Night's Dream*, Act II. Sc. II.)

you will find the countless objects of your observation and research. It seems to me right, however, that before closing the present series of letters, I should introduce to your notice some tribes of insects which have not been mentioned by Shakspeare, and relate some circumstances with respect to their history, which invest them either with interest or importance. You well know, "I have no superfluous leisure; my stay must be stolen out of other affairs; but I will attend you awhile," until the object I have now mentioned be accomplished.

And first, let me bring forward the singular habits of a large and important family of insects, the *Ichneumonidæ*. These singular beings deposit their

eggs, not in a waxen cell, not on the leaf of a plant, not in a silken bag constructed for the purpose,—but actually in the body of a living caterpillar. To



Pimpla manifestator depositing its eggs.

insects of this tribe, Linnæus gave the name of Ichneumon, from the analogy between their services and those of the ichneumons of Egypt: the former as the destroyer of insects, the latter as the devourers of serpents, the eggs of crocodiles, &c. When I mention that about three thousand species of ichneumons are at present known and described, it will be obvious that it would be impossible to enter into many details respecting them. I shall

therefore merely mention some of the peculiar habits of the tribe, and this I shall principally do in the words of Kirby and Spence.

"The habits of this whole tribe, which properly includes a great number of distant genera, are similar. They all oviposit in living insects, chiefly while in the larva state, sometimes while pupæ (*Ich. **puparum** L.*), and even while in the egg state (*Ich. **ovulorum** L.*), but not, as far as is known, in perfect insects. The eggs thus deposited soon hatch into grubs, which immediately attack their victim, and in the end insure its destruction. The number of eggs committed to each individual varies according to its size, and that of the grubs which are to spring from them, being in most cases one only, but in others amounting to some hundreds.

"From the observations hitherto made by Entomologists, the great body of the ichneumon tribe is principally employed in keeping within their proper limits the infinite host of lepidopterous larvæ, destroying however many insects of other orders; and perhaps, if the larvæ of these last fell equally under our observation with those of the former, we might discover that few exist uninfested by their appropriate parasite. Such is the activity and address of the Ichneumonidæ, that scarcely any concealment, except perhaps the waters, can secure their prey

from them; and neither bulk, courage, nor ferocity avail to terrify them from effecting their purpose." *

"An idea of the services rendered to us by those ichneumons which prey upon noxious larvæ may be formed from the fact, that out of thirty individuals of the common cabbage caterpillar (*Papilio brassicæ*) which Reaumur put into a glass to feed, twenty-five were fatally pierced by an ichneumon (*I. globatus*); and if we compare the myriads of caterpillars that often attack our cabbages and brocoli with the small number of butterflies of this species which usually appear, we may conjecture that they are commonly destroyed in some such proportion,—a circumstance which will lead us thankfully to acknowledge the goodness of Providence, which, by providing such a check, has prevented the utter destruction of the Brassica genus, including some of our most esteemed and useful vegetables." †

As these insects are so widely diffused, you will have no difficulty in obtaining specimens of various genera, and you will see at once that they belong to the same order as the bees, the wasps, and the ants, already described —the Hymenoptera. It is a remarkable fact, however, that these parasites, whose universal office it is in their first state of being to prey upon insects, are themselves liable to be preyed

* Kirby and Spence, p. 264. † Ib. vol. i. p. 266.

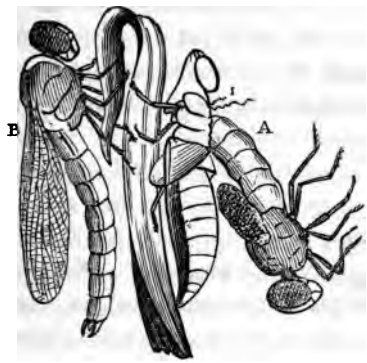
on in turn. Other species of ichneumons act towards them as they have acted towards the caterpillar, in whose living body they are enclosed. And these more minute Ichneumonidæ are sometimes so numerous as to destroy, it is said, the tithe of the kinds they attack. Should you be disposed to seek for information respecting the nomenclature and classification of these singular and interesting tribes, I would refer you to the "Essay on the Classification of Parasitic Hymenoptera," published in the Entomological Magazine, by A. H. Haliday, Esq., Clifden.

Let me now introduce you to another family, whose bodies are long and tapering, and who are adorned with four wings of a texture surpassing in beauty the finest net-work, and glowing in the sunshine with a splendid iridescence of colouring. Such might have existed in the imagination of Pope, when penning his description of the Sylphs attendant on Belinda:—

> "Some to the sun their insect-wing unfold,
> Waft on the breeze, or sink in clouds of gold."
> *Rape of the Lock*, Canto ii.

They differ considerably in size, and many of the smallest are arrayed in the most brilliant costume, being in the softest green, or in the brightest azure. Others assume a crimson uniform, while those among

whom they are found exhibit a mottled livery of brown, white, and yellow. You will conjecture I am alluding to the dragon-flies (*Libellulina* MacLeay), for those creatures, whose appearance is so rich, so graceful, and so airy, bear that terrifying appellation. I must admit that the epithet is justly applied, for their whole life is one continued scene of destruction.



A, *The Dragon-fly making its exit from the pupa;* B, *The same drying its wings.*

They are found so early as May, and I have seen them "labouring in their vocation" on the 4th of October. In their larva state they reside in water; and here they are the terror of aquatic insects, and even the successful assailant of the smaller fishes. One, about an inch and a quarter in length, which I lifted in my hand with some water, from one of the

ponds in our Botanic Garden, was in the act of preying on a tadpole, much more bulky than itself, and continued its operations without evincing the slightest discomposure. My relative, B. J. Clarke, Esq., of La Bergerie, Portarlington, on one occasion witnessed a struggle between one of these larvæ and a full-grown stickleback of twice its size. The huge mandibles of the assailant were extended across the head of the fish, one being inserted into each eye: and although the larva was taken from the water, and held suspended by the tail, it never for a moment relaxed its hold of the prey.

When elevated from the water into the genial warmth of the summer sun, and gifted in their perfect state with their full powers of destruction, they carry on a successful warfare against the other inhabitants of the air; hawking over the pools and rivers, seizing the Phryganeæ and Ephemeræ, lopping off their wings with great rapidity, and devouring their bodies. Nor are their attacks confined to these tribes: the elegant plumage which decks the Lepidoptera forms no protection, or perhaps makes them more conspicuous to their destroyer. Mr. B. J. Clarke has told me, that when fishing in the river Barrow, near that town, he has watched with great interest the proceedings of the large dragon-flies. Gardens and meadows extend in that

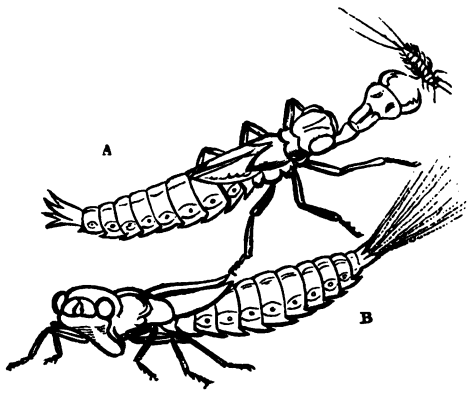
neighbourhood down to the banks of the river, and of course the white butterflies are not unfrequently to be seen upon its margin. My informant has often observed the dragon-fly dart down as a hawk upon a quarry, seize with its legs a firm hold of the butterfly, and carry it to a branch of one of the adjoining trees. In a moment one of the white wings would drop from the branch, then another would come wavering downwards, until the four had fallen, and the dragon-fly, after a short pause, would again dart forth in pursuit of a fresh victim. He never launched himself on his prey when on a perfect horizontal line with it; but took care to be either somewhat higher, or somewhat lower, so that he could seize it with his feet.

Perhaps from this account of their rapacity you will deem our English name of dragon-fly more suitable than the French term applied to the same insect—"demoiselles." The translation of the latter term is however the word used by Moore, in his delightful little poem of "Paradise and the Peri."

"When o'er the vale of Balbec winging
Slowly, she sees a child at play,
Among the sunny wild flowers singing,
As rosy and as wild as they;
Chasing with eager hands and eyes
The beautiful blue *damsel* flies,
That flutter'd round the jasmine stems,
Like winged flowers or flying gems."

Some of these insects (the *Agrionidæ*) seem to be attracted by particular colours. I have been informed by a friend that they have repeatedly alighted on the blue "float" of his fishing-line, and that even five or six might be seen resting on it at the same moment. My relative, Mr. Jellett of Ballymena, observed, on the banks of the river near that town, great numbers of a different genus flying about some beech trees, and frequently alighting on the smooth and shining stones. It occurred to him that the light colour which the trunks exhibited in the sunshine might be the attraction which brought the dragon-flies in such numbers to that place, rather than to any other. He instantly determined to put the accuracy of this idea to the test of experiment, laid aside the dark portions of his dress, and stood motionless, with his arms extended. A dragon fly almost immediately alighted on his breast, and was secured, another came in the course of a few minutes, and I have now in my cabinet five or six specimens taken on that occasion. They are of two species (*Calepteryx Virgo* and *C. Ludoviciana*); both are plentiful about the weir on the Barrow, near Portarlington, but I have never seen either of them in the neighbourhood of Belfast. Strange that they should have been found at two places, one a hundred and thirty miles further north than the other, and yet

that they should not have been recognized in the intermediate locality!



A, *The Dragon-fly, with its mask extended;* B, *the same, with the mask closed and discharging a current of water.*

The eyes of the dragon-fly are extremely beautiful, being prominent, and exhibiting an infinity of little hexagonal facets. These were counted by Leeuwenhoek, and were found, in a single eye, to amount to 12,000. Great as this number may appear, it is surpassed by that exhibited in the eye of some other insects, for 17,325 have been actually reckoned in that of a butterfly.

I have mentioned that the larva of the dragon-fly is an inhabitant of the water. It is in that state

furnished with a most remarkable apparatus attached to the lower lip. It resembles a mask of singular construction, and is used, not only for seizing the prey, but also for holding it while the jaws perform their customary office.* But you may, perhaps, inquire, how comes it that the larva is found in the water, while the perfect insect dwells in the air, sports in the sunshine, and is the constant denizen of an element so different from that in which it formerly dwelt? You may ask, how, and under what circumstances, are the eggs deposited, so that the enclosed young may, on their exclusion, be surrounded by the fluid in which the first stage of their existence is to be passed? I am glad, from the accurate observation of Mr. B. J. Clarke, to be able to answer this question. He has, on several occasions this summer (1835), seen the male and female dragon-fly alight on some of the aquatic plants in the canal adjoining his residence, having exhibited, while in the air, the strange appearance of one body, with a head at each extremity; a phenomenon which may have attracted your attention. The male would then fling himself into the air and fly away. The female adopted a different course. She deliberately turned her head

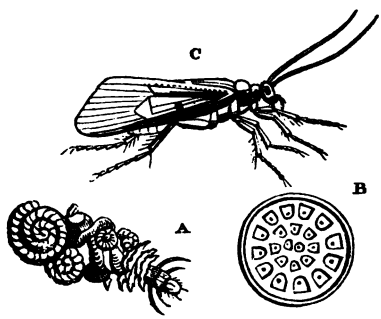
* For a most lucid description of this instrument, see Kirby and Spence, vol. iii. p. 125.

downwards, descended the stem or leaf of the plant, to a depth of some inches below the surface of the water, and there remained, as he supposed, for the purpose of depositing her eggs. It was strange to see a creature, who, but a few minutes before, had been winging her way through the air, thus quietly abiding in a different element, while the great work of providing a suitable situation for her young was about being accomplished. On one occasion, my informant, while she was thus engaged, touched her with the extremity of his fishing-rod; she then desisted from her work, crawled up to the surface, and after remaining there a few minutes, as if to allow the cause of her molestation to pass by, again directed her way downwards, and completed the important task in which she had been interrupted.

An analogous fact with respect to one of the May-flies (*Phryganeæ*), was noticed in a pond, in our Botanic Garden, by Mr. Hyndman. He has kindly favoured me with the following note respecting it, dated May 27, 1833:—"I first observed the Phryganea on the leaf of an aquatic plant, from which it crept down along the stem, under the water, very nearly a foot deep; it appeared then to have been disturbed by some stickle-backs which approached, and seemed inclined to attack it, and swam vigorously

and rapidly beneath the water, over to some other plants. I there took the insect up, and found a large bundle of eggs of a green colour, closely enveloped in a strong, jelly-like substance, attached to the extremity of its abdomen. The bundle of eggs was of an oblong form, bent in the middle, and the two ends attached to the tail of the animal."

The insects of this family are well known to you in their larva state, under the name of case-worms, or caddis-worms, and are to be found in every run-



A, *The Caddis-worm in cases of sand, shells, &c.;* B, *Grating of silk formed by the larvæ previous to assuming the pupa state;* C, *The Caddis-fly.*

ning stream, and almost in every ditch. Their habitations are extremely singular, and differ considerably, both in the materials employed, and in their

external configuration. Some are formed of numerous little pieces of grass, and stems of aquatic plants, cut into suitable lengths, and placed cross-ways, forming a rude polygonal figure; others are constructed of bits of stick, or grains of sand or gravel, cemented strongly together; and others, again, are composed of fresh-water shells, each containing its own proper inhabitant,—"a covering," as Kirby and Spence remark, "as singular, as if a savage, instead of clothing himself with squirrel skins, should sew together into a coat the animals themselves."

Some of these cases exhibit shells of three or four different kinds, and are hence interesting to the Conchologist, as well as to the Entomologist. Three, now in my cabinet, present specimens, altogether, of seven fresh-water shells, namely:—*Planorbis marginatus, P. contortus, P. vortex, P. glaber* (*?*), *Cyclas cornea, Valvata obtusa,* and *Paludina impura.*

To protect themselves from the attacks of their enemies, and, at the same time, to give admission to the supply of water essential to their existence, the caddis-worms, before assuming the torpidity of their pupa state, adopt an ingenious expedient. They construct a kind of grating, which they fix across each extremity of their domicile, and thus provide at the same time for respiration and defence. It is

stated, that this grating is formed of a strong description of silk, which the animal has the power of spinning, and which assumes, although under water, the necessary degree of consistence. In one of the cases in my possession, it is formed of a mass of minute portions of vegetable matter, so thick as almost to exclude water; and two holes are formed at the sides of the case, close to the extremity, for the ingress of the fluid. In another, some small bivalve shells (*Cyclas cornea*) are agglutinated together: and as their convexity leaves some vacant spaces between each shell, the object of the grating is attained by a different procedure. It would seem, therefore, that the larvæ, although endued with the power of forming a silken net-work, avoid the trouble of doing so, where the abundance of suitable materials of a different description, renders such a labour unnecessary. They appear to have the power of secreting the silken substance for some time before the period of their change into pupæ, if, indeed, they do not possess it from the first. This opinion was formed on one occasion, when I had a few caddis-worms in a glass of water, for the purpose of observing their movements. One of large dimensions projected his body a considerable way from his covering, until it touched the case of a smaller caddis-worm in its vicinity, and after a

peculiar kind of contortion, was again withdrawn The larger caddis-worm then put itself into motion; and to my surprise, I found that the lesser one was attached by a silken cable to his more bulky companion, and towed after him as a jolly-boat would be towed by a cutter, without the means of offering any resistance to its progress.

If you are attending to the proceedings of the caddis-worms in their natural habitats, you cannot fail to observe the rapid plunging movements of the great water-beetle (*Dyticus marginalis*). The male is easily distinguished from the female, by the curious hemispherical appendages on the anterior legs, which, acting like suckers, enable him to retain

A, *Larva*—B, *the perfect Dyticus marginalis.*

a hold of his mate in the unstable element they inhabit. Though living in the water, he is, at times,

especially in the evening, noticed in the air; for he is furnished with ample wings, and can at pleasure change his abode from one pool to another. In the winter of 1830, we had here a very hard frost, which lasted for several days, and the large ponds in our Botanic Garden were completely frozen. The late Mr. James Drummond, whose untimely death at Cuba every Naturalist must regret, was at that time the curator of the garden. I was informed by him, that the very first day the ice was broken up by thaw, he observed several of these water-beetles flying to the pond, and plunging into the water. A *Dyticus* which I kept in a glass vessel seized with avidity any crumbs of bread that were thrown in, but I could never observe that they were actually eaten. It was not so with a piece of raw beef: for on it he feasted with great apparent relish. By supplying this description of food, Esper kept one alive in a glass vessel three years and a half. There is, however, a kind of nutriment to which this insect appears even more partial, and this, I regret to say, is the smaller water-beetles, which it seizes and greedily devours. In its larva state, the *Dyticus* is equally formidable and rapacious; and not content with destroying the larvæ of gnats, ephemera, &c., will attack animals of larger dimensions. I knew it on one occasion to seize a stickleback, and

carry it off in despite of all the struggles of the fish*; and the editors of the *Entomologia Edinensis* inform us, in speaking of the rapacity of the *Dyticidæ* in the larva state, that they "observed one of the larger kinds transfix and suck out the juices of thirteen well-grown tadpoles, in a single day."

I must not, however, dwell in this manner on all the insect inhabitants of the water, else you might dread I was about to become, as Dogberry would word it, "as tedious as a king." But I may mention, that if you expand the ashy-coloured elytra of one common insect, the water-scorpion (*Nepa cinerea*), you will be pleased to find, under so hard and dusky an exterior, a soft and delicate pair of wings, folded on a ground of a peculiar shade of scarlet. If you watch another, which is here very abundant, the boat-fly (*Notonecta glauca*), lying on his back, and using his long and delicately-fringed feet as oars to impel him along, beware of taking him in your hand, or you may find by experience, as I have done, that the wound inflicted by his rostrum is both sharp and

* For an interesting fact with respect to our Irish three-spined stickleback, we are indebted to the observation of W. Thompson, Esq., Vice-President of our Natural History Society. He has pointed out the differential characters between it and the three English species described by Mr. Yarrell, and shown its identity with the *Gasterosteus brachycentrus* of Cuvier, found in the brooks of Tuscany.—Vide *Proceedings of Linnean Society, in the London and Edinburgh Phil. Mag. and Journal of Science*, vol. v. p. 229.

sudden. And if you continue your observations, you cannot fail to see insects of a different tribe (*Hydrometridæ* Leech), which scorn to adopt so common a procedure as swimming in the water, and who perform, with astonishing rapidity, the more wonderful feat of running upon its surface.

By the aid of Entomology, therefore, a pool of water may be made to furnish amusement and pleasurable occupation for many weeks. Bethink you for a moment, what an advantage, nay, what an untold treasure, it may thus become. When Titania, with all the powers fitting to her sphere, wishes to bestow what she deems most valuable, she exclaims,

> "I 'll give thee fairies to attend on thee,
> And they shall fetch thee jewels from the deep."
> *Midsummer Night's Dream*, Act III. Sc. I.

The goddess I serve will do more,—for she will "fetch thee jewels," not from the deep only, but from every ditch, every pool, every lake, every brawling rivulet, in your vicinity. And those jewels are your own,—they cannot be lost, or stolen; they abide, as all knowledge does, with the humble and sincere recipient,—they become part and parcel of his mental acquisitions. Which "jewels" are to be preferred? —the physical or the mental; those which adorn the body, or those which enrich the mind? Which goddess, then, would you select? Which potentate,

if you had the power of choice, would you serve? In whose ranks would you be enrolled?

> "Under which king, Bezonian? speak or die."
> *Second Part of Henry IV.*, Act V. Sc. III.

The mind, while engaged in this branch of science, is not only enriched by the knowledge of new facts, but is pleased and exercised in the endeavour to account for phenomena which seem to follow no regular order of succession. This is a legitimate and justifiable appplication of its powers:—

> "Sure, he that made us with such large discourse,
> Looking before and after, gave us not
> That capability and godlike reason,
> To fust in us unused."—*Hamlet*, Act IV. Sc. IV.

The investigation of the laws which regulate the appearance of any of the inferior animals, which send them forth as living beings endowed with all necessary instincts and powers, or which retard their developement for any indefinite periods of time, is deserving of attention from a reflecting and well-regulated mind. Many opportunities for such inquiries will be afforded by Entomology, for some insects are so irregular in the time of their appearance, being abundant in some seasons, or for some days, and then not seen again for successive years, that we are half tempted to exclaim, with Hamlet,—

"There 's something in this more than natural, if philosophy could find it out." Two or three examples of the kind alluded to may be mentioned, especially as they have occurred in the immediate vicinity of this town.

In August, 1825, a moth, with wings prettily marked, and of a metallic lustre (*Plusia festucæ*), appeared one evening at Cranmore, in considerable numbers, flying among the shrubs and flowers. A few were seen on the succeeding night; and from that period to the present, none, save one or two solitary specimens, have been observed. They were accompanied by unusual numbers of the gamma-moth, and seemed particularly attracted by large beds of the common pink (*Dianthus caryophyllus*), flitting from flower to flower, and banquetting on the nectar they afforded.

A common little gnat (*Chironomus virescens*), appeared in 1832, in very unusual numbers, in this neighbourhood. Mr. Haliday, in speaking of this insect, remarks:—"This little fly caused no little alarm this summer; its appearance in swarms being adjudged, by vulgar rumour, a precursor of cholera. In some places, they appeared in such numbers, that the inhabitants had some trouble in *shovelling* them out of their houses (in my informant's words). At

Donaghadee, clouds (of this species) were observed coming from seaward." *

Towards the latter end of the same summer, these little flies appeared one evening in immense multitudes in this town. Attracted by the light of the gas-lamps, they congregated around them, appearing like clouds, which were gradually lost in the surrounding darkness, but to which the eye could discern no limit. They were particularly abundant on the northern side of Donegal-square, and along Wellington-place, and College-square East.

The common cockchafer (*Melolontha vulgaris*) never appears here in such numbers as to cause that exhilirating bustle among the feathered tribes, described by Mr. Knapp. † Neither does it produce that hum, heard when swarms are on the wing in the evening, which Kirby and Spence casually mention as an ordinary occurrence in England. ‡ It is, on the contrary, an insect not generally known throughout the country; and on more than one occasion, a specimen of it has been brought to me as an addition to my cabinet. I was surprised, therefore, when, on the 22nd of May, 1835, I was informed by Mr. Scott, the intelligent head-gardener of the Marquis

* Catalogue of Diptera occurring about Hollywood, in Downshire. *Entomological Magazine*, No. ii. p. 147.

† Journal of a Naturalist.

‡ Introduction to Entomology, vol. ii. p. 377.

of Donegal, that numbers of these insects were then appearing at Ormean, the residence of that nobleman. As the distance does not exceed a mile from Belfast, I walked out in the afternoon of that day, to witness the fact for myself—the best mode in every department of Natural History. I was shown, at the aviary, a large bowl of cockchafers, both male and female, which had been collected a few hours before; I was then conducted along a gravel walk, through which the insects had forced themselves when emerging from the pupa state, and coming to the surface. The holes made by them along the walks, and the borders at either side, were so numerous, that one would almost have thought the place had been exposed to a heavy downward fire of musquetry. The walks had been made above nine years, been in constant use during all that period, and received, occasionally, an additional coat of gravel. How wonderful, then, must the strength of the beetle have been, when it could force itself through this compact and indurated mass! Yet, that it did so, admits of no dispute. The fact was first noticed by the Marquis himself, who, being then in rather delicate health, spent much of his time amid the walks of his own demesne. It was afterwards confirmed by the observations of several other witnesses; and the condition of the walk, independent of any other evidence, would be proof suffi-

cient. Mr. Scott informed me, that during the twelve years he had been at Ormean, he had not, until this season, seen a cockchafer; and that the insect seemed equally unknown to all the labourers in his employment. I make no doubt, however, it would not thus have escaped the more prying eye of the Entomologist.

In 1688, and for some years afterwards, a host of these insects occasioned no inconsiderable alarm and distress in the county of Galway, and even extended their ravages as far as the river Shannon. They appeared in such multitudes as to darken the air, and give serious annoyance to all who were travelling on the roads, or abroad in the fields. "A short while after their coming, they had so entirely eat up and destroyed all the leaves of trees, for some miles round about, that the whole country, although it was in the middle of summer, was left as bare and naked as if it had been in the depth of winter, making a most unseemly, and, indeed, frightful appearance; and the noise they made while they were seizing and devouring this their prey, was as surprising; for the grinding of the leaves in the mouths of this vast multitude all together, made a sound very much resembling the sawing of timber." *

* Letters from Dr. T. Molyneux, F.R.S., to the Lord Bishop of Clogher, dated Dublin, 5th Oct. 1697, published in "Boate's Natural History of Ireland," Dublin, 1726, p. 165.

The abundance of particular insects in some seasons, and their comparative scarcity, or total absence, in others, excites, naturally, the supposition, that some necessary condition for their developement has been wanting. What this may be, it would be useless, in the present state of our knowledge, to conjecture; but it may not be out of place to remark, that a somewhat analogous fact is observable in the vegetable world. There are years, when particular plants assume an appearance of unwonted luxuriance; and other years, when the same plants, under circumstances apparently as favourable, are either stunted in their growth, or fail altogether to appear. One instance of this took place in a piece of ground visible from the windows of my own dwelling-house. On the site where the new wing of the Royal Academical Institution now stands, my friend, the Rev. Henry Montgomery, LL.D., was in the habit of raising a few culinary vegetables. In the spring of 1830, he sowed, at the usual period, a considerable quantity of parsley seed: it yielded no return. The ground was raked over again, and fresh seed sown, but with no better success. Between March and August, the operation was repeated four times, the ground being twice dug over, but not a leaf appeared. The next year the same piece of ground was planted with peas and cabbages, but no parsley

showed itself. Early in the spring of the third year (1832), and without any further labour or care, save that of digging to prepare for another crop, the place was covered with one dense and luxuriant mass of parsley, so thick and plentiful that every seed which had lain dormant for the preceding seasons seemed to have been endued at once with all the power requisite for a vigorous and fertile existence.

As your labours may perhaps assist in shedding l'ght o'er "the palpable obscure" which now shrouds the operations of nature in the developement both of insect and vegetable life, I shall dwell no longer on this topic. I pass on, therefore, to another, although I begin to fear you may be tempted to exclaim,

> "What! will the line stretch out to the crack of doom?"
> *Macbeth*, Act IV. Sc. II.

The scarcity or total absence of particular insects at certain periods, and their great abundance at others, is a phenomenon that falls but seldom under the eye of the Entomologist. The discovery of a new or of a rare insect is a result which of course can only occasionally be obtained; but there is another circumstance, which affords scarcely less pleasure, and which is by no means of such unusual occurrence. I refer to the discovery of insects, already known, but in places where apparently they were not likely to be

found, or in localities where their existence had not previously been observed. This is another of those analogies which the mind delights to trace between the animal and vegetable world, for we not unfrequently find an insect appearing

"Like a wild flower, where it was least expected."

One instance of this, of a somewhat ludicrous kind, fell under my observation while I lived in High-street. A favourite cat was observed by one of the servants to have caught, at the back entrance to the dwelling-house, a diminutive and unusual-looking object. It was taken from her clutches, and brought to me. On examination, I found it was one of those *Cimicidæ* which feed on the juices of plants, and which, of course, are usually found in woody places. How it came into one of the principal business streets of Belfast it would be useless to conjecture; but when I announced that a specimen of *Pentatoma rufipes* had thus been captured, I was bantered not a little by the members of the household, who alleged that poor pussy must have been smitten, like myself, with a fondness for entomological pursuits.

As another example of the same kind may be mentioned, the unexpected recognition, at Cranmore, of *Cossonus Tardii*, by my friend and fellow member,

Robert Templeton, Esq., R.A. It was found by him in June, 1829, on the under side of an alder which lay in the farm-yard, and had been stripped of its bark. This insect is one of the *Curculionidæ*, or weevil tribe. It was first discovered in July, 1822, under the bark of decayed hollies near Powerscourt waterfall, county of Wicklow, by the late James Tardy, Esq., of Dublin, in company with N. A. Vigors, Esq., who conferred its specific name in honour of his friend. Mr. Curtis remarks—"It appears, like all wood-feeding insects, to be extremely local; for Mr. Tardy, in a letter, says—'I have in vain sought for it in places abounding as much in holly, and in similar situations, in the same county.'" In fact, I believe the Irish *Cossonus*, for so it is called, had not been detected in any locality except that where it was originally discovered, until it fell under the observation of Mr. Templeton. It is still taken at Cranmore, in precisely the same situation where it was first observed, and usually in little groups of four or five individuals, ranged together side by side. It is not, however, strictly confined to the one spot, but has also been taken in the adjoining garden, and is particularly abundant under the decaying bark of alders.

The last instance I shall adduce of the seizure of known insects in unexpected situations relates to one

of the burying beetles (*Silphidæ*). Their English name imports what is their most distinguishing occupation, which is, in reality, that of interring the bodies of numerous small animals. They are grave-diggers by profession. It is their "vocation," and most sedulously do they perform its duties. At first view, one of this tribe would seem to lead a very laborious life, but "custom hath made it in him a property of easiness," and the object to be attained converts the labour into enjoyment. That object is to provide a proper nidus for the eggs, and provide the future grubs with the sustenance necessary for their subsistence and developement. Of course the beetle is usually to be found where there are decaying animal substances, or fungi similar in smell. One of them (*Necrophorus mortuorum*) was, however, taken where it was "least" to be "expected," near the summit of Sleive Croob. This is a high mountain in the county of Down, and can scarcely be ascended in favourable weather without exciting the feeling so well embodied in the exclamation of the poet:—

> "Oh! there is sweetness in the mountain air,
> And life, that bloated Ease can never hope to share."
> *Childe Harold*, Canto I. Stanza XXX.

It was here, far away from all appearance of putrid or decaying substances, with the pure and balmy

breezes of the mountain playing around us, that the insect was observed. The party, consisting of three of my fellow members, and myself, was about commencing the descent, when the beetle, with a flight particularly strong and vigorous, darted into one of our gauze nets, and continued for a considerable time afterwards to make a humming noise, not unlike that of a bee when angry.

And now, my dear Arnold, I shall detain you no longer. The field seems indeed inexhaustible, but as you are about entering on its investigation for yourself, I need not enlarge on its productions. One of my objects has been already accomplished: I fondly hope "the greatest is behind." I expect that one branch of inquiry is, in your case, but "the happy prologue" to another; for all the sciences are so connected, that, although we distinguish them by several names, we cannot understand one, without paying homage to many others on the same vigorous and graceful stem. While, therefore, I say—

> ——— "thou shalt be as free
> As mountain winds,"—*Tempest*, Act I. Sc. II.

I anticipate that, while you observe the various tribes of insects in their several haunts, you will gradually and almost insensibly acquire a knowledge of the botanical characteristics of those leafy dwellings which so many of them frequent, and hence be pre-

pured to wander, at some future period, amid the wild flowers of Spring, the richer denizens of the parterre, and the deep and luxuriant forests, which are depicted by Shakspeare. Whether these or their feathered choristers be your study, you will find in Nature, however varied her costume and external appearance,

——— "A prone and speechless dialect
Such as moves men,
And well she can persuade."

Measure for Measure, Act I. Sc. III.

INJURIES OCCASIONED BY INSECTS IN DIFFERENT PARTS OF IRELAND.

An orange-coloured gnat (*Tipula tritici* K.),* belonging to the genus Cecidomyia of Latreille, frequently proves very destructive to the wheat crop, by depositing its eggs in the centre of the corolla. The loss occasioned by the young grub which is there produced is unhappily too well known. In this dis-

* For figures of *two* destructive species of *Cecidomyia*, see p. 25. See also an article, by Mr. Westwood, on the Destructive Properties of Insects, in Loudon's Gardener's Magazine, No. 85, April, 1837.

trict its ravages in the summer of 1828 produced no inconsiderable degree of alarm.

Another individual of the same genus (*C. bicolor*) deposits her eggs in the leaf-buds of one of our prettiest spring-flowers,—the *Veronica chamædrys*. The nidus, thus formed, might at first glance be mistaken for a seed-vessel, but if broken open will exhibit a small reddish caterpillar, the embryo of the future insect. The attacks of the fly seem as widely diffused as the plant itself, for they have attracted my attention in various parts of the south, and throughout the northern counties of Ireland.

In May, 1827, the young grafts of apple-trees in an extensive nursery belonging to the late Mr. Harvey, near this town, were destroyed by a reddish-grey coloured weevil (*Otiorhynchus notatus*); almost the entire plantation fell a sacrifice to the attacks of this insect.

In June, 1830, a considerable loss was sustained in the Botanic Garden here, from another individual of the same tribe (*Otiorhynchus vastator* and *Ligustici*). It destroyed a vast number of flowers, by ascending the stems at night, and cutting them through. During the day-time it buried itself in the earth, from which its colour was scarcely distinguishable.

A more formidable visitor was, however, the wire-worm. Many who have had their crops of grain or

of grass injured by its depredations, are not aware that it is the grub of a very common beetle, one of those popularly termed skipjacks (*Hemerhipus segetis*). It destroyed in the garden, during the same season, above a thousand plants, but fortunately few or none of a rare or valuable kind. One plant was raised for examination, and above fifty wire-worms were found preying on its roots. For this information I was indebted to the late Mr. Thomas Drummond, then curator of the garden.

As linen is the staple manufacture of this part of the country, and gives employment in various departments to many thousand persons, the flax crop is naturally regarded as one of very high importance; yet here a diminutive insect had the hardihood to interfere, and, despite of all the efforts of man, nearly destroyed, in many parts of the county Down, in the summer of 1827, the entire crop of flax. The minute assailant was a little jumping beetle (*Haltica parvula*) *, resembling that called the turnip-fly, but much smaller. Specimens of it are preserved in the cabinet of Mr. G. C. Hyndman.

In 1832 I visited the county Wicklow, and heard from several persons there, an account of the defoliation produced by a caterpillar. It was stated that

* See ante, p. 22.

many trees had at Midsummer the appearance they usually present at Christmas, and that they put forth a second growth of leaves. Great fear, which a little knowledge of Entomology would have dispelled, was entertained by the country people, that when the leaves of the forest trees had been devoured, their potato crops would next have been attacked. The denudation caused by this caterpillar extended from Arklow along the "sweet vale of Avoca," past "the meeting of the waters," and on to the entrance of the valley of the Seven Churches. I am unable, from the vague accounts I received, to form any idea of the species by which these ravages had been committed. From the manner in which some oak trees in this neighbourhood have been stripped of their leaves, by the caterpillars of the bufftip moth (*Pygæra bucephala*), it is possible this more extensive defoliation may have been occasioned by the same insect.

An instance of destruction caused by another caterpillar came to my knowledge, near to Portarlington, Queen's County. The insect destroyer in this case was the larva of a moth, not merely rare, but, so far as I have been able to ascertain, unrecorded, as belong to our Irish Fauna,—I mean the goat-moth (*Cossus ligniperda*). It was discovered at Woodbrook, the seat of Major Chetwood, in 1830. Some trees in the demesne had assumed an unhealthy appear-

ance; my informant, a member of the family, happened to strike one of them smartly with his stick, when, to his surprise, the bark gave way, and revealed a colony of caterpillars. In consequence of this discovery, and for the purpose of at once extirpating the cause of the evil, six or eight full-grown trees were felled, and about two hundred of these new and unknown caterpillars destroyed. My friend was soon after this time informed what they really were, and received so many applications for specimens, that he was induced to institute a strict search for them through the plantations, but without success. In the ensuing summer he renewed his scrutiny, with precisely the same result, nor did he succeed until July, 1832, when a large ash tree in the lawn evinced unequivocal symptoms of being the object of attack. The caterpillars were at that time rapidly proceeding with their mining operations. Three of them were brought to Belfast by my brother, and five of them about two months afterwards by myself. By comparing them with drawings and descriptions I was then fully convinced that they were the larvæ of the *Cossus ligniperda;* but I had not the gratification of seeing the perfect moth, for none of them attained maturity, and only one assumed the form of a chrysalis.

The caterpillars of a smaller moth were very abun-

dant in some parts of the county a few years ago, and caused considerable defoliation. The moth (*Yponomeuta euonymella*) is white; its wings prettily marked with numerous black dots. The larvæ spin a large white web, not unlike some kind of cotton fabric; and under this they live together in numerous communities. In 1828 they appeared in such quantities about Whitehouse, three miles from this town, that all the Euonymus trees in the shrubberies there were destroyed, the leaves being devoured, and the plant covered by their webs, or rather enveloped in them. At the Cave Hill every plant of the *Euonymus europæus*, which there grows wild, was left without a leaf. Along the Falls road the ravages of the same caterpillar were visible. From Lough Neagh I have specimens of this insect, along with some of an allied species (*Yponomeuta padella*) which assisted in the work of devastation. Mr. William M'Clure, wine-merchant of this town, informed me, that he had an extensive orchard on the banks of the Lough, at the Crumlin river, which sustained very considerable damage from the destruction of the crop by these assailants. My friend, Mr. John Brown of Randalstown, made at my request some inquiry respecting these insects, and in March, 1834, kindly communicated the following information with regard to their ravages in that neighbourhood:—

"The gardener at Shane's Castle informs me, that the caterpillar so injurious to apple trees made its appearance for the first time on the spindle-tree, or forest-box, and the elder in the park, principally about the mouth of the river Main, in the year 1819. In 1820 the apple trees in Shane's Castle nursery were infested, and in the following season all the apple trees in both garden and nursery. For several years in succession the trees exhibited very little of either leaves or fruit, and so ruinous were the depredations of the caterpillars considered, that about the year 1827 or 1828 Lord O'Neill ordered to be raised and thrown into the lake, all the apple trees in the nursery, and a number trained as espaliers in the garden. His order was obeyed as to the raising; but the trees were collected by two farmers, who 'headed down' and planted them in their gardens, where they have since become healthy, and produced good crops. Between the years 1826 and 1828 the evil was at the worst; since then it continued to decline, until 1830 or 1831, when it entirely ceased. Nearly all the fruit at Shane's Castle was destroyed; and in Mr. Adams's garden I know that fully one-half was lost."

I shall conclude my enumeration of the ravages committed by caterpillars by an instance of the evil caused by the grubs of the *Tipulidæ*, or crane-flies,

For this information I am indebted to my friend, James Grimshaw, jun. Esq., of Whitehouse, one of the original members of our Natural History Society, who thus communicated the fact as it fell under his observation :—

"In the spring of 1817 the ravages committed by the larvæ of the *Tipula* were so great, that many crops of clover and grass, in the neighbourhood of Lurgan, were lost, and almost all, with very few exceptions, materially injured. I was at that time staying with an intimate friend, Mr. Christy of Kircassock, who complained that whole fields, which were laid down in grass and clover, were so infested by what is usually called the cut-worm,—that he had nearly come to the resolution of again breaking up the fields, and planting them anew. My friend was accounted one of the best agriculturists in the district; and, by careful examination, he ere long discovered the destroyer, and the remedy soon followed. He took me to several fields to show me the cause of the evil. When he removed the earth with his hand, to the depth of about an inch, the part which was laid bare appeared quite alive with a thick short grub of a dirty greenish appearance. These grubs attacked the roots of the grass, and the weather being remarkably dry, the crop soon perished. At that time, in fields where the verdure one day appeared lively and green, in

three or four days afterwards every blade of grass would be dried up, and nothing meet the eye but the red earth, as if the proprietor had laid out his ground for a summer fallow. I asked him how it was possible to get rid of this grub, and found his remedy was to roll the field with a heavy roller, drawn by a horse, and thus to crush the larvæ."

While these sheets were passing through the press I have had the pleasure of perusing a paper written by my relative, B. J. Clarke, Esq., on the natural history of one of our garden pests, the Gooseberry saw-fly. I can now only avail myself of the part in which its ravages are mentioned. Mr. Clarke says, "On arriving at La Bergerie (Portarlington, Queen's County) the latter end of June, 1837, I was informed by the gardener, that what he termed the green-worm blight was rapidly stripping the gooseberry and currant plantations of their leaves, and that, when he shook the trees, a profusion of the green-worm, to use his own expression, fell from them. On inspection, I found the injury arose from countless numbers of the larvæ of the gooseberry saw-fly (*Nematus ribesii*), which adhered to the leaves, devouring all the pulpy part, and leaving nothing but the thick fibres standing out, giving the denuded trees a most spectral appearance. I frequently reckoned twenty or thirty of these pseudo-caterpillars,

as Reaumur terms them, clinging to one leaf by their pro-legs, and never leaving it, as long as a particle of green matter remained. What appeared remarkable was, that they carefully avoided the black currant trees, and should one intervene in their course of devastation it always remained perfectly untouched. By the end of the first week in July they had completed their work of demolition, the fruit hanging exposed to the scorching rays of the sun, which completely deprived it of flavour."—"By the middle of August the trees had so far recovered their leaves as to afford a hope of some fruit being saved, when the second brood of larvæ made their appearance, and commenced their work of destruction on the young foliage."

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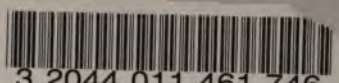

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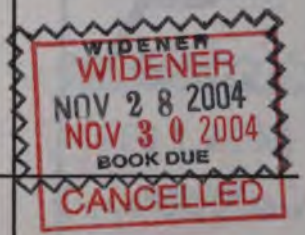
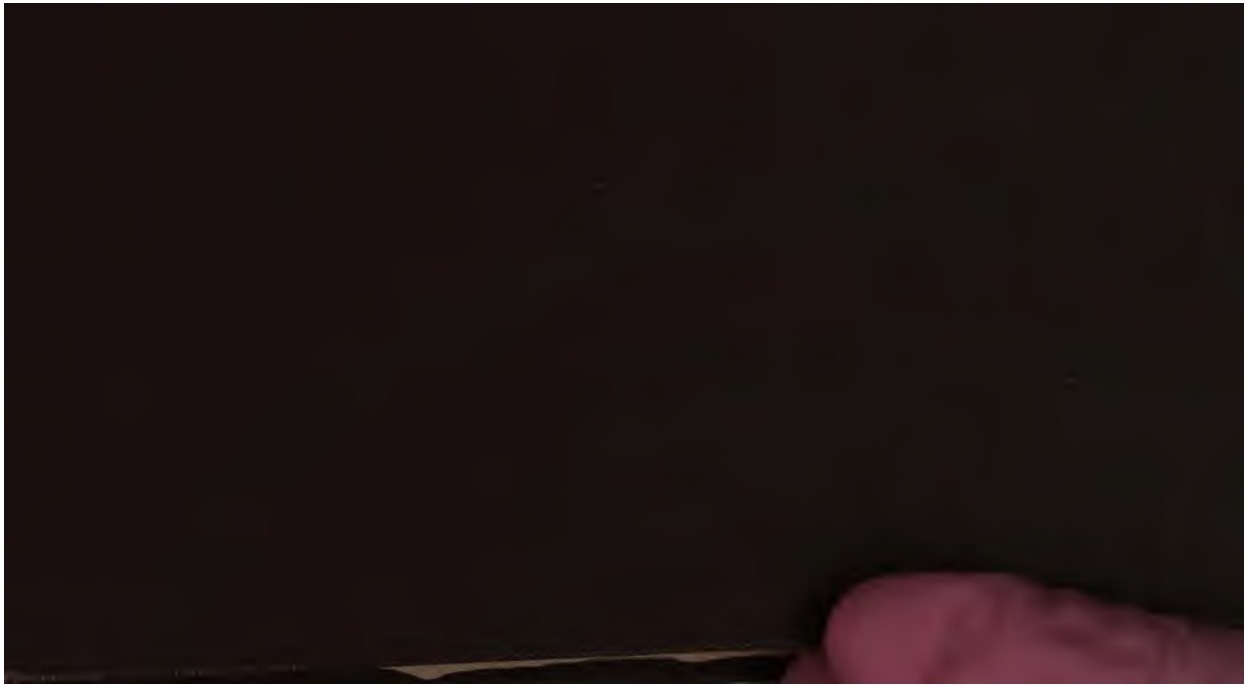
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